

Compliments of

William Windom

President.

THE AMERICAN AND MEXICAN PACIFIC RAILWAY

OR

TRANSCONTINENTAL SHORT LINE.

ILLUSTRATED WITH 17 DIAGRAMS AND MAPS.

BY

ALEX. D. ANDERSON,

AUTHOR OF "THE SILVER COUNTRY; OR, GREAT SOUTHWEST;" AND "THE TEHUANTEPEC
INTEROCEAN RAILROAD."



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OFFICES OF THE COMPANY: 1509 H Street, Washington, D. C.

P R E F A C E.

THE object of the following facts and figures is to present to capitalists and the public the superior merits of a new Pacific Railway. Its present corporate name is "The Texas, Topolobampo, and Pacific Railroad and Telegraph Company," but for the purposes of this pamphlet we will call it "The American and Mexican Pacific Railway"—a name more in harmony with the main idea, and more appropriate in contrast with the various Pacific railways north of it in the United States and Canada. We will include under this title not only the line across Northern Mexico from the Gulf of California to the Rio Grande, but the lines supplementing and extending it across Texas to Galveston and across our Southern or Gulf States to the Atlantic seaboard at Fernandina, Fla., and Brunswick, Ga. Several branch lines in Northern Mexico will also be included under the same head.

All of these lines have great local merit, and the trunk-line has in addition striking transcontinental features and advantages.

But the merits of the project are so conspicuous that facts speak best for themselves, and we will rest the case upon the following plain statement, prepared in legal brief style, with a citation of authorities.

ALEX. D. ANDERSON

CORCORAN BUILDING,

WASHINGTON, D. C., *May, 1883.*

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THE AMERICAN AND MEXICAN PACIFIC
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I.

HISTORICAL NOTES.

THE construction of transportation routes from the interior to the seaboard has occupied the attention of the United States ever since it became an independent Republic. Even before the adoption of the Constitution, in 1789, Gen'l Washington urged the importance of uniting in commercial ties the Mississippi Valley with the Atlantic States, by means of a canal from the Potomac, or James river, to the headwaters of the Ohio, and wrote to the President of Congress and the Governor of Virginia in advocacy of the project.

As early as 1817 the Erie canal was commenced, and was opened in 1826, thereby uniting the grain regions of the West with New York city.

A few years later the era of railways was fairly inaugurated, and the work of their construction has continued until the whole Mississippi Valley and all States east of there are covered with a net-work of lines, all of which connect with the great trunk roads leading to the Atlantic seaboard.

From the interior to the seaboard, on the south, railway outlets are less numerous, but the neglect is partially counterbalanced by the existence of great natural water-ways—the Mississippi and its many tributaries intersecting twenty-one States and Territories, and comprising over 15,000 miles of present navigation.

From the interior to the seaboard, on the west, there are but few miles of river navigation, and until 1869, when the Union and Central Pacific roads were opened, there was no railway outlet. A glance at a commercial map of the United States is sufficient to discover extensive areas unknown to steam transportation by river or rail—blank spaces which the demands of a progressive commercial age require to be filled.

But the subject has not been entirely overlooked, notwithstanding it has received inadequate treatment, for prior to the late civil war the United States, through its War Department, made over fifty surveys for wagon-roads, railways, &c., between the Mississippi river and the Pacific coast. Some of these explorations were across Mexican territory prior to our acquisition in 1848 of the broad area now subdivided into Cali-

fornia, Nevada, Utah, Arizona, and New Mexico. Many other explorations were made by unofficial parties.

As early as 1824 a trading caravan went from Missouri into Northern Mexico, a part going as far as the Gulf of California. In 1825, Senator Benton reported to the Senate a bill providing for the marking out of a road from Missouri to the border of Mexico, and supported it by a powerful speech. In his "Thirty Years' View" he alludes to his effort in 1825 to develop trade in that direction, and says: "The State of Missouri, from her geographical position and the adventurous spirit of her inhabitants, was the first to engage in it, and the 'Western Internal Provinces'—the vast region comprising New Mexico, El Paso del Norte, New Biscay, Chihuahua, Sonora, Sinaloa, and all the wide slope spreading down towards the Gulf of California, the ancient 'Sea of Cortez'—was the theatre of their courageous enterprise."¹

A detailed review of the many surveys and explorations from the Mississippi Valley to Northern Mexico and to the Pacific ocean at different points is impossible here, for it would require several well-filled volumes. The reader can find nearly all of this information in the twelve quarto volumes on Pacific Railroad Surveys and Explorations prepared by the War Department under authority of the act of March 31, 1853. In volume I, in the letter of the Secretary of War transmitting this elaborate report to Congress, is a concise review of the merits of the proposed railway routes to the Pacific, in which he emphatically states the superiority of the route farthest south—that along the 32d parallel of latitude near the Mexican border. Many of the reasons which he gives for this preference may be applied with still greater force to the Topolobampo route: but he could not make such an application, as he was then considering simply the routes within the limits of the United States.

With this official report in print, and before the public ever since 1855, it seems strange that its expressed preference was not observed by Congress in locating and subsidizing the first Pacific road. But other considerations than the merits of the respective routes determined this location. When the charter for the Union and Central Pacific route was granted in 1862 the country was divided by a civil war, and the southern route was, for that reason, impossible. A similar reason has also prevented a railway across Northern Mexico, for that country was from the time of her independence, in 1821, until a recent date, in a chronic state of revolution. Happily, both countries are now free from internal dissension. Commerce and the arts of peace can now be considered upon their merits, and commercial highways be located and built where most useful,

¹ *Thirty Years' View*, vol. I, p. 41.

regardless of State or sectional lines or the geographical line dividing two adjoining and friendly Republics.

Under these favorable circumstances the American and Mexican Pacific route is presented to the public upon its merits. Its history is as follows: In 1872, Albert K. Owen, a civil engineer connected with Gen'l Wm. J. Palmer's and Gen. W. S. Rosecrans' railway reconnaissance, had occasion to examine the Pacific coast of Northern Mexico, together with the Cordilleras and central plateau. His attention was called to Topolobampo harbor by Dr. Benj. R. Carman, of Mazatlan, Mexico, who, because of its superiority, had, together with Señor Don Blas Ybarra, purchased the surrounding lands which were available for a city site. Returning to the United States, Mr. Owen projected a railroad to connect this harbor with the Texas lines, and had introduced in Congress a bill providing for a railway survey across Northern Mexico to that point, and supported the same before the Senate and House Committees on Pacific Railroads by earnest and unanswerable arguments and briefs.

The bill was favorably and unanimously reported by the Senate and House Committees on Pacific Railways of the 44th and 45th Congress—having been previously passed upon by a special committee of U. S. engineers, appointed by the Department of War—but, like hundreds of other bills upon a crowded calendar, failed to receive final action. In the meanwhile a new era of peace and material development had dawned upon Mexico, and instead of legislation at Washington for a railway survey Mr. Owen organized a company in Boston and New York, and application was made for a railway concession at the city of Mexico.

Anticipating a favorable reply to its request for a charter, the company sent an expedition to make a reconnaissance of the route and harbor, which work has already been completed, and the report of the same printed. It is exceedingly favorable, and fully confirms Mr. Owen's statements before Congress concerning the practicability and advantages of the route.

Since writing the above we have discovered a valuable endorsement of the merits of a commercial highway across Northern Mexico to the Gulf of California, as follows:

In 1859, during the administration of President Buchanan, a treaty of Transits and Commerce was signed by the official representatives of the two adjoining Republics. The transit lines referred to were the Isthmian or Tehuantepec route and a line across Northern Mexico. The United States Minister at Mexico, in one of his despatches to our State Department, dwelt upon the importance of the line across Northern

Mexico, and in another despatch, said : “*Exercising my own discretion and judgment, I would appropriate five million dollars to the transits.*”

The correspondence relating to this proposed treaty has never been made public, but has been called for by a Senate resolution, and will doubtless soon be printed and accessible.

In concluding this brief historical statement we will add that this trunk line across Northern Mexico, supplemented by the line across our Gulf States to Fernandina, Fla., is the first transcontinental route ever explored in America ; for early in the 16th century that daring Spanish explorer, Alvar Nuñez (commonly known as Cabeza de Vaca) travelled over almost identically the same route in his remarkable trip from Florida to the early Spanish settlements on the Gulf of California.

II.

CHARTER AND CONCESSION.

Charter.

THE corporate name of the Company is "*The Texas, Topolobampo, and Pacific Railroad and Telegraph Company.*" The charter was granted under the general railroad law of Massachusetts, on the eighth of March, 1881—a law which offers many advantages, and which was selected after very careful examination by the legal advisers of the Company.

The Concession.

The concession from Mexico was obtained on the 13th of June, 1881, and amended and enlarged on the 5th day of December, 1882. Its leading provisions are as follows:

The right to construct and operate for 99 years a trunk line of railroad (standard gauge) from Topolobampo Bay to Piedras Negras, on the Rio Grande; also branches from the trunk line to Alamos in Sonora, Mazatlan in the State of Sinaloa, to Presidio del Norte on the Rio Grande, and to other points, a total of about 2,000 miles.

The right to alienate the branches but not the main line until after said main line is completed.

The Company may connect its lines with any others within or without the limits of Mexico, and may co-operate with other companies as they may agree.

It must always be held to be Mexican, and be subject to the laws of that Republic.

It is entitled to a subsidy from the Mexican Government of \$8,064 per mile upon all of its lines, making a total subsidy of about \$16,000,000.

Vessels entering any port of the Republic with material and supplies for the railway are to be exempt from tonnage, light-house, anchorage, and port duties, for a period of 15 years.

The Company has the right of way for $227\frac{1}{2}$ feet— $113\frac{3}{4}$ each side of the track—along all of its lines.

Deposits of ore, coal, salt, marbles, and all other metals and minerals,

found in the prosecution of the work of construction, are to belong to the Company, provided the rights of third parties^{*} are not thereby prejudiced.

Construction materials of all kinds are to be free from every class of import and custom-house duty for fifteen years.

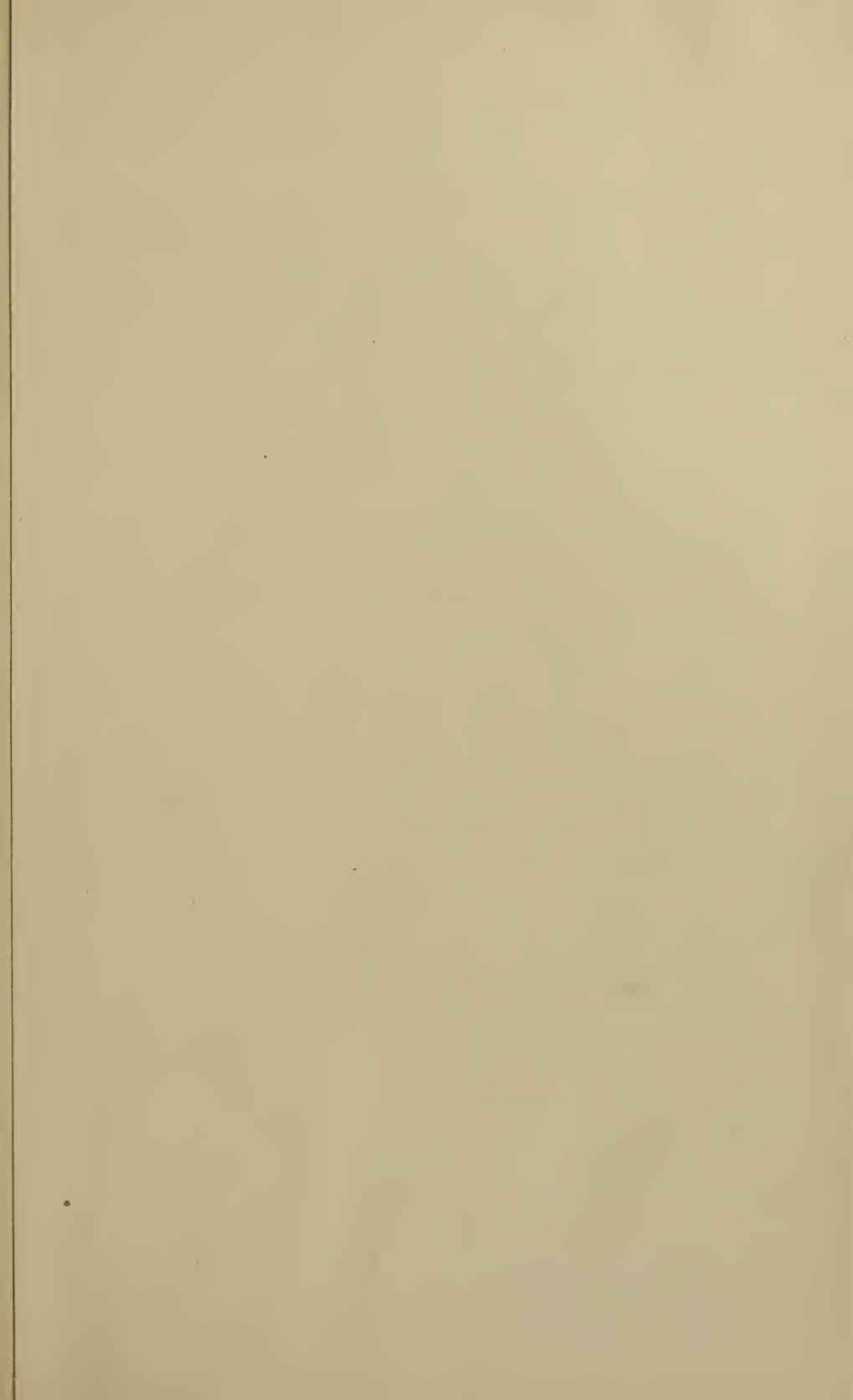
The lines of the road and their appurtenances, also the capital employed in constructing and operating the same, the common and preferred shares, bonds, and obligations of the Company, shall be exempt from all taxes, except stamp dues, for a period of fifty years.

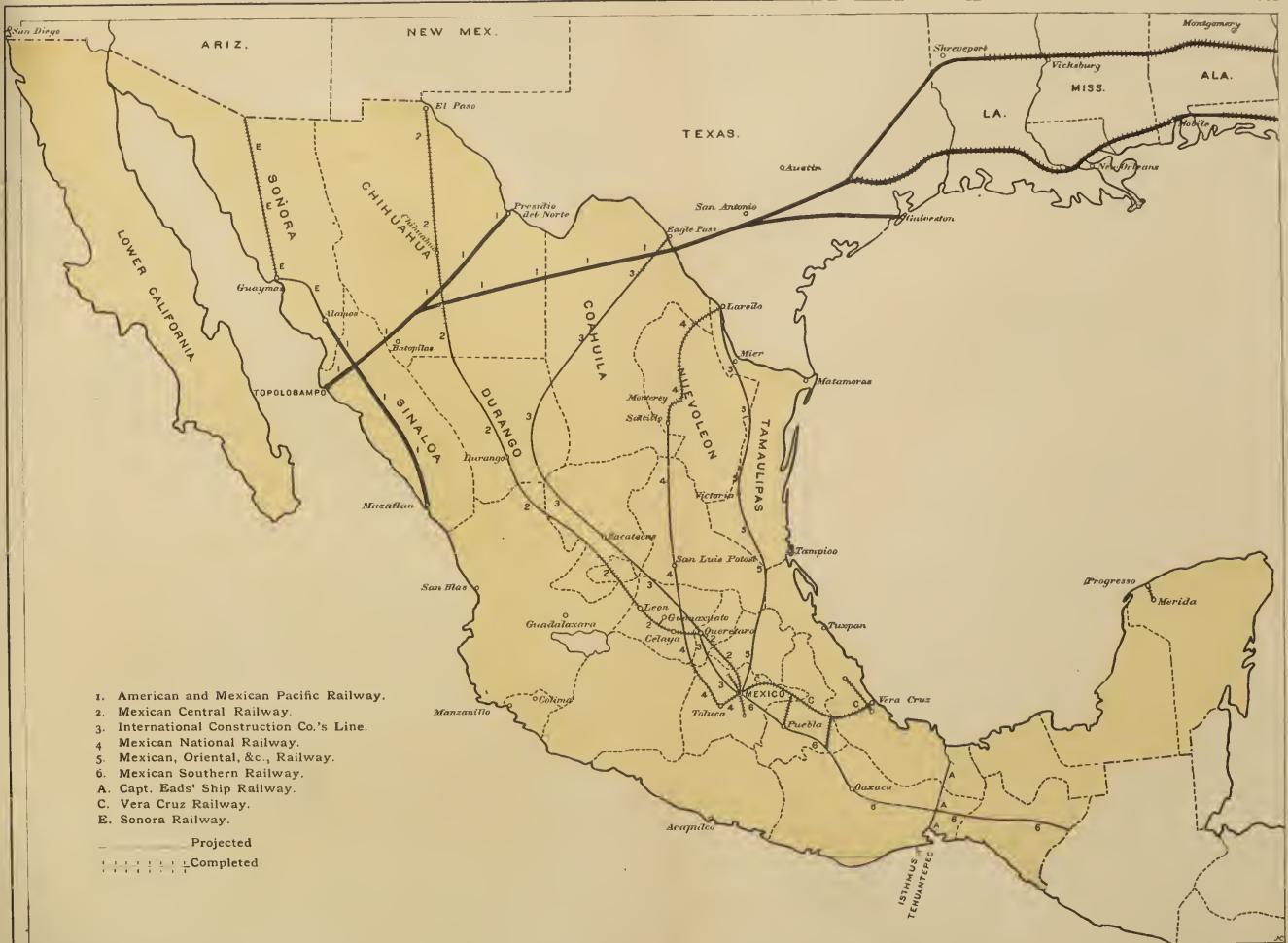
The freight tariffs of the Company are not to exceed the following rate per ton per kilometre of distance: 6 cents on first class, 4 cents on second class, $2\frac{1}{2}$ cents on third-class freights, and $1\frac{1}{2}$ cents on coal.

The passenger tariff per each kilometre travelled is not to exceed 3 cents for first class, 2 cents for second class, and $1\frac{1}{2}$ cents for third-class passengers.

The Government of Mexico engages not to subsidize any parallel road within a limit of 25 leagues on each side of the Company's lines.

The Company is at liberty to obtain additional subsidies from the governments of the States intersected by the road.





THE AMERICAN AND MEXICAN PACIFIC RAILWAY—ITS RELATION TO MEXICO.

III.

ITS RELATION TO MEXICO.

THE American and Mexican Pacific Railway is based upon a different idea from that underlying the four great international lines projected from the Rio Grande to the city of Mexico. It is pre-eminently a mining and transcontinental road, tapping the marvelously rich mines of Northern Mexico, and, at the same time, forming a short trunk line to the Pacific coast from the great commercial centres of the Mississippi Valley and our Atlantic seaboard. The combined areas of Chihuahua, Coahuila, Sinaloa, and Sonora, the four States intersected by the main line and branches, is 273,294 square miles, or nearly four times the area of all New England. It is greater than France, England, and Belgium combined. The general public seem to misunderstand this point, and some timid capitalists fear that the railway business in Mexico is being overdone. It may be well to meet this objection at the outset.

An Open Field.

The United States, with an area of 3,026,494 square miles, had, in 1882, 117,000 miles of railway.

Mexico, with an area of 763,804 square miles, or twenty-five per cent. of that of the United States, had, in 1882, only about 2,000 miles.

To be on a level with the United States in this respect she should now have 29,250 miles.

But this is not all. The United States has navigable rivers to the extent of about 25,000 miles, the Mississippi and its forty-two navigable tributaries¹ being navigable to the extent of 15,710 miles, and the other rivers flowing into the Atlantic, Gulf, and Pacific, such as the Hudson, Potomac, James, Tombigbee, Trinity, Brazos, and Columbia, to the extent of about 10,000 more.

Mexico, because of her peculiar formation, which is about three-fourths table lands, has almost no river navigation—not over 2,000 miles in all.

The United States has canals to the extent of 4,000 miles.

Mexico has no canals, and never can have many, for the same reason that she is without navigable rivers.²

¹ The Mississippi and Tributaries, by Alex. D. Anderson, pp. 17 and 18.

² The "Viga" canal, 12 miles long, connecting Lakes Chalco and Xochimilco with Mexico City and the "Lazarus" canal, 5 miles from Mexico, to Lake Texcoco, are too small to place in the above table of transportation routes.

The total mileage of transportation lines from the interior to the seaboard of the two Republics is, then about as follows:

	<i>United States.</i>	<i>Mexico.</i>
Railways.....	117,000	2,000
Navigable rivers.....	25,000	2,000
Canals.....	4,000	0
 Total.....	 146,000	 4,000

It follows that, from the standpoint of area, Mexico should now have 36,500 miles of inland transportation lines to be on a level with us, of which all but about 2,000 miles must be railways.

From the standpoint of population the case is as follows :

The United States had, in 1880, a population of 50,152,866. Mexico had, in 1880, a population of 9,577,279, or nineteen per cent. of that of the United States. As her area is only 25 per cent. of that of the United States, her population per square mile is almost as dense as ours. From this standpoint, then, she should have 19 per cent. of our inland transportation facilities, or 27,740—all but about 2,000 of which must be railways.

In natural resources, mines, and agriculture Mexico is, in proportion to area, as rich as the United States. From this standpoint she requires twenty-five per cent. of our inland transportation facilities, or 36,500 miles—all but 2,000 of which must be railways.

The Recent Concessions.

The question now arises, is this Mexican field likely to be over occupied by railway builders ? Are the recent railway concessions too numerous and extensive ?

Robert B. Gorsuch, Esq., a Mexican engineer, has recently compiled for the writer a full list of the railway concessions made by the Mexican Republic since the overthrow of Maximilian's empire, from which it appears that the total mileage of concessions existing December 31, 1882, was but about 17,000, or less than half the above stated railway requirements of Mexico from the standpoint of area, and less than two-thirds of her requirements from the standpoint of population.

Of the total lines projected, about 5,000 miles may not be constructed at present; but the remaining 12,000 miles are likely to be both constructed and completed within the coming few years. The total amount of subsidies, on which Mexico is liable under the concessions made up to December 31, 1882, is stated by Mr. Gorsuch to be about \$126,000,000.

In this connection it may be well to observe that our Pacific railways alone received from the United States a grant of 150,000,000 acres of land, and a loan of bonds to the extent of \$64,623,512.

We see nothing in the above array of figures to indicate that the railway business of Mexico is being overdone. On the contrary, the field is the most open and promising one that can be found upon the face of the earth, and has been too long neglected by our capitalists and railway builders.

IV.

ITS RELATION TO THE UNITED STATES.

A S was shown on a previous page, the American and Mexican Pacific is based on a different idea from the international roads extending from the Rio Grande to the city of Mexico, and is comparatively independent of them. But it is most intimately connected with the railway systems of Texas, the Mississippi Valley, and all States east of the Valley.

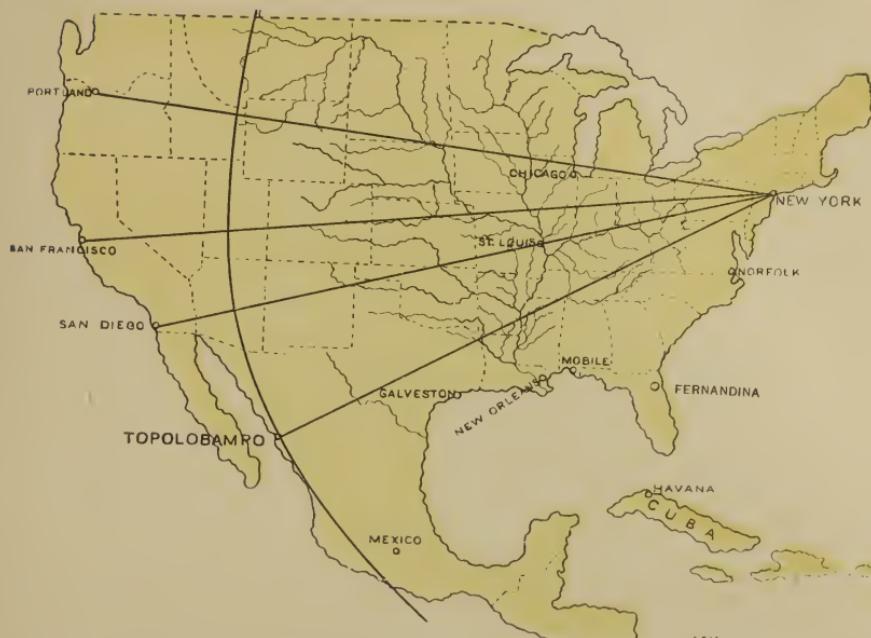
The True Southern Pacific Line.

It is the natural and short trunk line to the Pacific for the roads coming from St. Louis, Cincinnati, Louisville, Memphis, Nashville, Norfolk, Savannah, Brunswick, Atlanta, Fernandina, New Orleans, and all Southern cities. A glance at a map of trans-Mississippi railways now in existence shows that while the central portion of the Mississippi Valley is covered with a perfect net-work of lines, there is a broad blank in the great Southwest which needs to be filled.

As a Short Line to the Pacific.

It may seem a broad assertion, but nevertheless it is a fact, that each and every one of our Atlantic ports, from Portland, Maine, to the southern extremity of Florida; each and every one of our Gulf ports, from Florida to the mouth of the Rio Grande; each and every city of the Mississippi Valley west of Omaha and south of Wisconsin, is nearer the Pacific Ocean at Topolobampo than at San Diego, San Francisco, or Portland, the termini, respectively, of the Texas Pacific, Union Pacific, and Northern Pacific roads. The following diagrams will demonstrate the correctness of the assertion :

AS A SHORT LINE TO THE PACIFIC.



	Miles
New York to Topolobampo	2,261
" " San Diego	2,426
" " San Francisco	2,565
" " Portland	2,437



	Miles
Chicago to Topolobampo	1,661
" " San Diego	1,732
" " San Francisco	1,856
" " Portland	1,753



AS A SHORT LINE TO THE PACIFIC.



	Miles.
St. Louis to Topolobampo	.....
" " San Diego	1,416
" " San Francisco	1,557
" " Portland	1,738
	1,718



	Miles.
New Orleans to Topolobampo	.....
" " San Diego	1,200
" " San Francisco	1,608
" " Portland	1,926
	2,064

The above air line distances show the following saving from the great commercial centres of the Mississippi Valley, and the Atlantic seaboard to the Pacific coast, at Topolobampo.

From New York Standpoint :

	<i>Miles.</i>
Topolobampo nearer than San Diego.....	165
" " " San Francisco.....	304
" " " Portland.....	176

From Chicago Standpoint :

Topolobampo nearer than San Diego.....	71
" " " San Francisco.....	195
" " " Portland.....	92

From St. Louis Standpoint :

Topolobampo nearer than San Diego.....	141
" " " San Francisco.....	322
" " " Portland.....	302

From New Orleans Standpoint :

Topolobampo nearer than San Diego.....	408
" " " San Francisco.....	726
" " " Portland.....	864

From Galveston Standpoint :

Topolobampo nearer than San Diego.....	430
" " " San Francisco	778
" " " Portland.....	983

Contrast of Actual Lines of Travel:—We have taken air-lines instead of actual routes for the above contrast, as the point under consideration could thus be more clearly illustrated by diagrams. But the saving of distance in favor of the Topolobampo route is usually greater if we contrast actual railway lines.

From New York city the distances are as follows :

New York to San Francisco :

	<i>Miles.</i>
Via Pa. R. R. to Pittsburg.....	444
" Ft. Wayne & Chi. R.R. to Chicago.....	468
" Chi. R. I. & Pac. R'way to Omaha.....	500
" Union Pac. R'way to Ogden.....	1,033
" Central Pac. R'w'y to San Francisco	895
Total.....	3,340

New York to Topolobampo :

	<i>Miles.</i>
Via Pa. R.R. to Philadelphia.....	90
“ P., W. & B. R.R. to Baltimore.....	98
“ B. & P. R.R. to Washington.....	43
“ Midland R.R. to Lynchburg.....	178
“ Norfolk & West'n R.R. to Bristol.....	204
“ E. Tenn., Va. & Ga. R.R. to Chattanooga.....	242
“ Ala. & Gt. So. R.R. to Meridian	295
“ Vicks. & Mer. R.R. to Vicksburg.....	140
“ Vicks., Shreve. & Pac. R.R. to Monroe.....	73
“ Monroe to Shreveport, about.....	77
“ Tex. Pac. R.R. to Longview.....	63
“ Interna. & Gt. N. R.R. to San Antonio.....	343
“ San. A. & Border R.R. to Eagle Pass.....	150
“ Amer. & Mex. Pac. R'w'y to Topolobampo.....	700
Total.....	2,696

The result shows that the projected railway line to Topolobampo is 644 miles shorter than the actual and usual route to San Francisco, being more than double the saving shown by the above air-line distances.

From St. Louis, which is a central city in the Mississippi Valley, and is so related to the railway lines east of the Mississippi river that the test from this standpoint is a very fair one, the comparison is as follows

St. Louis to San Francisco :

	<i>Miles.</i>
Via Wabash, St. L. & Pac. R'w'y to Omaha.....	410
“ Union Pac. R'w'y to Ogden.....	1,033
“ Central Pac. R'w'y to San Francisco.....	895
Total	2,338

St. Louis to Topolobampo :

	<i>Miles.</i>
Via St. L., I. Mt. & S. R'w'y to Texarkana.....	490
“ Tex. Pac. R'w'y to Longview.....	97
“ I. & Gt. N. R'w'y to San Antonio.....	343
“ San A. & Border R'w'y to Eagle Pass.....	150
“ Amer. & Mex. Pac. R'w'y to Topolobampo.....	700
Total	1,780

In other words, the distance by way of the projected railway line to Topolobampo is 558 miles less than the actual customary and most direct line to San Francisco, being a far greater saving than shown by the above air-lines.

As a Short Line to the Atlantic.

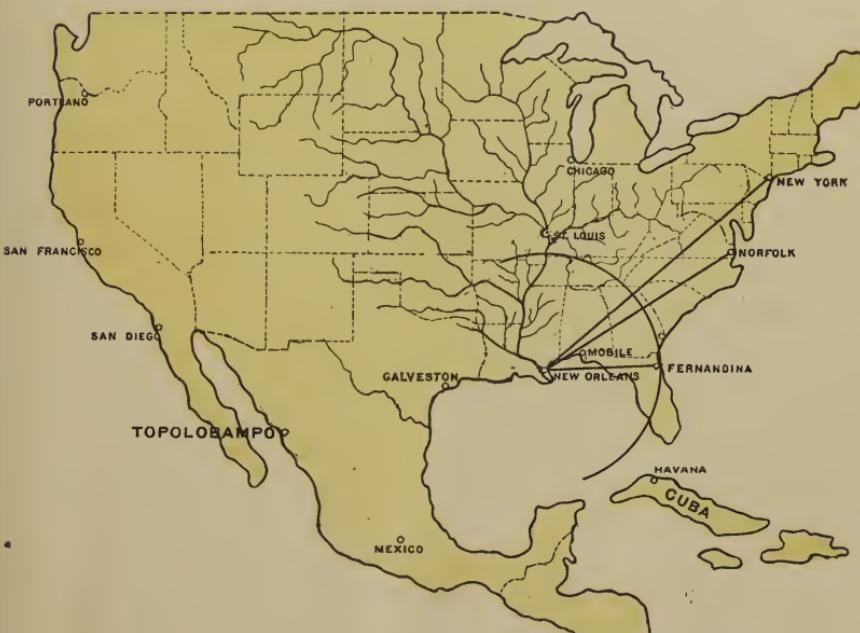
If we reverse the above diagrams from the standpoints of St. Louis and New Orleans, we will find that the line to Fernandina has similar advantage over more northern routes as a short outlet to the Atlantic seaboard.

AS A SHORT LINE TO THE ATLANTIC.



Miles.

St. Louis to Fernandina	755
" " New York	880



Miles.

New Orleans to Fernandina	505
" " Norfolk	930
" " New York	1,180

The above air-line distances show the following saving from the Mississippi Valley to the Atlantic seaboard.

From St. Louis standpoint :

	<i>Miles.</i>
Fernandina nearer than Norfolk.....	20
" " " New York.....	125

From New Orleans standpoint :

Fernandina nearer than Norfolk.....	425
" " " New York.....	675

As a Transcontinental Short Line.

By reference to the map of transcontinental railways preceding Chapter I, the reader will find a still more pointed contrast of distances than those we have just given.

The distances across the continent are as follows :

	<i>Miles.</i>
Via Canadian Pac. and connections to Quebec.....	3,409
" Northern " " " " New York.....	3,305
" Central " " " " ".....	3,340
" Atlantic & Pac. and connections to New York.....	3,114
" Southern " " " " Norfolk.....	3,555
" Amer. & Mex. Pac. and connections to Brunswick.....	2,205
" " " " " " " Fernandina.....	1,995
" " " " " " " Galveston.....	1,070

The saving of distance *via* the American and Mexican Pacific route from Topolobampo to Fernandina is, then, as follows :

	<i>Miles.</i>
Shorter than Canadian Pac. route.....	1,414
" Northern " ".....	1,310
" Central " ".....	1,345
" Atlantic & " ".....	1,119
" Southern " ".....	1,560

Other Advantages.

Not only is it the shortest possible route across the continent, but it is a railway complete in itself. We mean by this that each end is, in supply and demand, the complement of the other. Georgia is fast becoming a second New England in industrial pursuits, and can supply Texas and Northern Mexico with cotton and other manufactures, while Texas and Northern Mexico can send in return beef, grain, wool, and silver.

The route is also complete in another important respect. At each end is a fine harbor—the one a favorable starting-point for the markets of

Europe, and the other admirably situated for reaching the commerce of the Orient and South Sea.

It is always free from the periodical snow-blockades which so seriously annoy the patrons of the Union and Northern Pacific lines.

Of the climate of Northern Mexico Dr. Wislizenus says in writing of Chihuahua: "The climate generally is temperate. The influence of the most southern latitude of the State is counterbalanced by its high elevation above the sea. In the mountainous parts of the Sierra Madre there is, of course, a great variety in the seasons; hot summers, rainy seasons, and severe winters often follow each other. But on the plains of the plateau, between 4,000 and 5,000 feet above the sea, there prevails a delightful constant climate, with moderate temperature in summer and winter, with a clear and dry atmosphere, interrupted only by the rainy season, which generally lasts through July and August." * * * "The great dryness of the atmosphere produces, of course, a very free development of *electricity*. By rubbing the hair of cats and dogs in the dark, I could elicit here a greater mass of electricity than I had ever seen produced in this way."¹

As was stated in the Historical Notes on a previous page, the Secretary of War in transmitting to Congress, in 1855, the voluminous reports on the various Pacific Railway Surveys and Explorations west of the Mississippi River, expressed a decided preference for the most southern route—that along the 32d parallel of latitude. His reasons for this preference were as follows:

"This is the shortest route; and not only is its estimated cost less by a third than that of any other of the lines, but the character of the work required is such that it could be executed in a vastly shorter period."

* * * "Temporary tracks could be laid upon the natural surface of the earth to almost any extent to serve for the transportation of materials and supplies."

"The climate on this route is such as to cause less interruption to the work than on any other route."

"Not only is this the shortest and least costly route to the Pacific, but it is the shortest and cheapest route to San Francisco, the greatest commercial city on our western coast, while the aggregate length of railroad lines connecting it at its eastern terminus with the Atlantic and Gulf seaports is less than the aggregate connection with any other route, as will be seen by reference to the appended table B."

"With regard to the circumstances which affect the cost of working and maintaining the road, they are more favorable than on any other

¹ Sen. Mis. Doc. 26, 30th Cong., 1st sess., p. 55.

route. In this dry climate the decay of cross-ties and other timber would be very slow, and the absence of severe frost would have a most important influence upon the permanence of the road-bed, and heavier grades could be adopted than in a climate where ice and snow prevail.

"The snows on all the other routes, except that of the 35th parallel, could not fail, at certain seasons, to suspend the working of the road, for on all such snows are known to have fallen as would interpose an effectual barrier to the passage of trains. Such an occurrence in this desolate region would be attended with more serious consequences than in inhabited districts."

"In only one important respect is this route supposed to be less favorable than some of the others, and that is in the supply of fuel."

The strongest of these arguments may be applied with double force to the Topolobampo route, and doubtless would have been so applied by the Secretary of War, if Northern Mexico had been within the jurisdiction of his report. And the only important objection which he states may be urged against the 32d parallel route, "the lack of fuel," cannot be urged against the Topolobampo route, for as was shown on previous pages there is an inexhaustible supply of both timber and coal along and near the the line of the road.

In brief, the American and Mexican Pacific line is the best that can possibly be projected across the American continent, and is destined to be exceedingly popular with the travelling public.

V.

TRIBUTARY MINES OF SILVER AND GOLD.

Value of Mines to a Railway.

IN the opinion of competent judges—persons who have had occasion, in a business way, to observe the amount of transportation accruing to railways which intersect mining regions—one good developed silver or gold mine furnishes more patronage than a city of ten thousand inhabitants. This is considered a moderate estimate of the value of a mine to a railway. The vast amount of transportation required by mining regions is owing to the fact that heavy machinery, timbers for the mines, supplies, and provisions have to be brought from other points. What, then, are the mineral resources along the line of the road?

Mining Statistics of New Spain.

We can best answer this question by first taking a comprehensive view of the silver and gold products of the former Vice-Royalty of New Spain, through the centre of which the Topolobampo line is projected.

New Spain was for three hundred years—1521 to 1821—the name of the broad southwestern country comprising present Mexico and her cessions to the United States of 1848 and 1853. Those cessions have since been subdivided into California, Nevada, Arizona, New Mexico, Utah, Texas,¹ and Southern Colorado.

A careful compilation from official and other standard sources—viz : Humboldt's New Spain, the Reports of the U. S. Commissioner on Mining Statistics, Director of the U. S. Mint and others—shows the following sum total of products, viz :²

Mexico.....	1521-1804.....	\$2,027,952,000
Do.....	1804-1848.....	768,188,420
Do.....	1848-1876.....	702,000,000
Do.....	1876-1881.....	145,000,000

¹ Texas declared her independence from Mexico in 1836, but as she was included in the treaty of Guadalupe Hidalgo of 1848, it is proper to call her a portion of that cession.

² The Silver Country, or Great Southwest, by Alex. D. Anderson, p. 51.

California.....	1848-1876.....	1,064,628,502
Do.....	1876-1881.....	90,844,000
Nevada.....	1848-1876.....	293,233,910
Do.....	1876-1881.....	170,687,000
Arizona	1848-1876.....	7,962,000
Do.....	1876-1881.....	12,162,000
New Mexico.....	1848-1876.....	6,075,000
Do.....	1876-1881.....	2,980,000
Utah.....	1848-1876.....	17,472,773
Do.....	1876-1881.....	28,007,000
Total of New Spain, 1521 to 1881.....		\$5,337,192,605

Of this vast sum the chief portion was silver. Contrasted with the whole world the silver product of New Spain was as follows, up to the beginning of 1876:¹

Years.	Silver product of the world.	Silver product of New Spain.
1492-1804	\$4,455,130,000	\$1,948,952,000
1804-1848	1,223,781,674	685,418,247
1848-1868	971,060,000	489,100,000
1868-1876	582,100,000	378,837,078
Total, 1492-1876	\$7,232,071,674	\$3,502,307,325

In other words, *from 1492 to 1804 New Spain produced forty-three per cent. of the silver of the world; from 1804-1848, fifty-six per cent.; from 1848-1868, fifty per cent.; from 1868-1875, sixty-five per cent., and during the year 1875, seventy-five per cent.*²

The Marvellous Wealth of Northern Mexico.

The mines in the States of Northern Mexico have not been as thoroughly worked as those in other portions of New Spain, but they are marvellously rich, and will, as soon as supplied with railway transportation, enter upon an era of development destined to surpass the palmiest days of Spanish rule. The authorities upon this point are both abundant and reliable.

Ward, the British Minister to Mexico in 1827, reported as follows: "The States Durango, Sonora, Chihuahua, and Sinaloa contain an infinity of mines hitherto but little known, but holding out, wherever they have been tried, a promise of riches superior to any that Mexico has yet produced."³

¹ The Silver Country, or Great Southwest, by Alex. D. Anderson, p. 61.

² Ditto, p. 63.

³ Mexico in 1827, by H. G. Ward. Vol. I, p. 452.

J. R. Bartlett, the U. S. Commissioner on the boundary between Mexico and the United States, wrote, about 1853 : "I shall not enter into any particulars as to the great variety of mines in the State of Chihuahua, as the subject is too extensive to be treated of in a work like the present. I have, however, collected much information respecting it which may hereafter be given to the public. At present I will merely say that the mineral wealth of Chihuahua is not surpassed, if equalled, in variety and extent in any State in the world."¹

In 1864 a report on the mines of Chihuahua was expressly made for Napoleon III by Dr. Roger Dubois, the French consul. He testifies as follows : "Of all the States of the Mexican Republic, Chihuahua is without contradiction, the richest in minerals, and we count no less than three thousand different mineral leads that were explored in the last century, the greater part of which are silver."²

In 1868 the Mexican Committee on Mining Taxes said in their report : "The mineral wealth of the States of Durango, Sonora, and Chihuahua is greater than all the rest of our territory from certain indications, and it will be developed as soon as settlers are protected from the scalping-knives of the savages."³

Dr. Wislizinus, whose report on Northern Mexico has been published as one of the miscellaneous documents of the United States Senate, wrote : "The silver mines of the State of Chihuahua, though worked for centuries, seem to be inexhaustible. The discovery of new mines is but a common occurrence, and, attracted by them, the mining population moves generally from one place to another without exhausting the old ones."⁴

United States consul Garrison, under date of September 30, 1872, reported to the State Department as follows : "Sonora is undoubtedly one of the most valuable mineral States of Mexico, rich in mineral wealth. Immense stores of silver, gold, copper, lead, and iron yet remain buried in her mountains all over the State. There have been discovered in this State over seven hundred gold and silver mines which have mostly been worked to some extent; also tin, coal, &c., and gold and silver placers, and a mountain of plumbago, and two of white marble, saltpetre, soda, potash, &c."⁵

The same officer says in his annual report of 1876 : "There are many

¹ Vol. II, p. 438, of his Personal Narrative.

² From manuscript copy of the report in possession of the writer.

³ Production of the Precious Metals, by Blake, p. 320.

⁴ Senate Mis. Doc. 26, 30th Cong., 1st sess.

⁵ Commercial Relations for 1872, p. 689.

good mines near Alamos owned mostly by Englishmen, and 150 to 200 small mines partially worked." There are large mines in the same locality now owned and worked by Americans.

Alamos is in the southern part of Sonora, and (as will be observed by reference to the map of Mexican railways) is the northern terminus of one branch of the Topolobampo line.

In 1873 the official representative of the United States residing at Mazatlan reported as follows of Sinaloa: "The State, we may say, is literally covered with silver mines. You can go in no part of the State but that mines are to be found. During the last year three scientific gentlemen were sent to Mexico by the Prussian Government to visit and report on the mines. They made a thorough examination of all the prominent mining districts in Mexico, and visited Sinaloa last. They told me that their report would be, that what is called the Pacific slope, the west side of the Sierra Nevada mountains, would be the great mining silver mart of the world for the next hundred years. This range of mountains runs the whole length of the State of Sinaloa—about 400 miles.¹

Hon. Camilo Vega, member of the Mexican Congress from the State of Sinaloa, writes: "At Bacubrito, district of Sinaloa, begins an auriferous zone which, in some parts, measures from thirty to forty miles in width, for a distance of over one hundred miles across the Fuerte district, as far as El Sabino Cuate, the boundary line between the States of Sinaloa and Sonora. Many places in that zone, as Bacubrito, San Jose de Gracia, Yecorato, Minitas, Realito, Sabino Cuate, Las Papas, and Cieneguitas, have yielded immense quantities of placer and mine gold. From time to time real bonanzas have been struck in some of these places, owing to large extractions of gold which have been coined at the Culiacan and Alamos Mint, and it is probable that the greater part of the gold was sent abroad without being reported. In some of these places grains of pure native gold of large size have been found, never seen equalled until the great California bonanza came before the public."

In 1868, J. Ross Browne, who was the first U. S. Commissioner of Mining Statistics, wrote: "Durango is very rich in silver, but its wealth was not known until just before the revolution, and there has been comparatively little exploration since. The State, like Sonora and Chihuahua, has suffered severely from Apache incursions. The city of Durango, one hundred and ninety-five miles northwest of Zacatecas, had only eight

¹ Commercial Relations for 1873, p. 839.

thousand inhabitants in 1783 ; but in that year Zambrano, the great miner of that region, discovered the mines of Guarisamey, and Durango soon trebled its population. In twenty-four years he extracted \$30,000,000 from his claims ; and a multitude of mines were opened, so that the average yield of the State was estimated to be \$5,000,000."¹

In 1859, Charles Sevin, F. R. G. S., on his return from Mexico, where he had been to see "how far the mineral wealth of these regions can be worked to advantage with English capital," read before the Royal Geographical Society of London a very valuable paper on the Mexican mines, in which he said of Santa Eulalia, in the State of Chihuahua: "In a space of two square leagues all the mountains of Santa Eulalia contain silver ; more than two hundred mines have been worked in these confines, and upwards of fifty of them have been sunk to a depth of two hundred yards. Some of these are so extensive that one whole day will not suffice to see the different parts of one alone. With regard to the immense amount of silver extracted from the mines of Santa Eulalia the following statements will be found interesting. At the most flourishing time a contribution was raised of two grains of silver from every marc extracted for the purpose of building two churches—one at the city of Chihuahua, the other at Santa Eulalia. They were built in a few years. The cost of that of Chihuahua was \$600,000 ; of that of Santa Eulalia, \$150,000—and a surplus of \$150,000 of the money collected in this manner remained. The result of the contribution therefore amounted to \$900,000, which corresponds to an amount of 145,000 mares of silver, worth at the real value of that metal \$145,000,000, extracted from the mines of Santa Eulalia in the course of a few years. It cannot be supposed that the produce of these mines, rich as they were up to the last operations, suddenly stopped by the expulsion of the Spaniards, should have retained the same ratio at all periods. However, the whole amount of silver which they have yielded, though it is to be divided over a number of about one hundred and thirty years, will be found very great. In the year 1833 a census of this whole amount was made, and it was found to have been 43,000,000 mares of silver, or \$430,000,000."² The Company's branch line to Presidio del Norte goes near Santa Eulalia.

Baron Humboldt, who is universally recognized as the leading authority on the mineral resources of Mexico, says that native silver "has been found in considerable masses, sometimes weighing more than two hun-

¹ Resources of the Pacific States, by J. Ross Browne, p. 648.

² Jour. of Royal Geog. Soc. for 1860, p. 33.

dred kilogrammes,¹ in the seams of Batopilas,' in the State of Chihuahua.² The Company's main line passes near Batopilas.

George W. Simmons, Jr., one of the expedition which recently crossed Northern Mexico in behalf of the Topolobampo Company, says in his report on the reconnoissance: "Whatever direction our road may take across the mountain, it will be impossible to cut its path without making valuable mineral discoveries." * * * "The road will pass through what is acknowledged to be the richest mineral belt in Mexico. The mines already discovered would certainly pay to-day the interest on a large capital, and ought to furnish business enough to support the entire road. When it is remembered that this section is barely prospected, that a thousand mines will be worked within a short time where one is worked to-day, and that every mining camp will form a town, it is not difficult to understand the enthusiasm of all who have visited this portion of the route and speak of it from experience."³

John E. Price, Esq., one of the same party, says in his report: "The immense yield of the Mexican mines makes it undeniable that some of the largest and richest mineral deposits in the world are there. The proposed route of the American and Mexican Pacific Railway will pass through one of the richest regions of the Republic, and when the grading for it is being done many valuable properties will be unearthed. Batopilas, Urique, Rosario, Parral, Santa Rosa, and many other celebrated districts are upon or near the proposed route."⁴

The celebrated Sierra Majada mines, whose discovery in 1879 created great excitement throughout Mexico, and attracted many thousand miners, are also near the line of the road, being at the junction of the States of Coahuila, Chihuahua, and Durango.

On the above stated theory that one good developed mine is in value to a railway the equivalent of a city of at least ten thousand people, the Topolobampo line and branches will soon be as thickly dotted with mining equivalents as the New York Central Railway is with commercial cities and villages. For this reason alone it is safe to assert that the railway will receive an immense and lucrative local patronage.

¹ 444 lbs.

² Humboldt's New Spain, Vol. III, p. 157.

³ Reports of George Simmons, Jr., Dr. B. R. Carman, and John E. Price, Esq., upon the Topolobampo Railway route, pp. 12 and 21.

⁴ Ditto, pp. 40-11.

VI.

TRIBUTARY COAL AND IRON.

Coal Fields of Northern Mexico.

IN some recent editorial comments on the coal deposits of Mexico, the *Springfield* (Mass.) *Republican* contained the following: "The discovery of coal in Mexico lies at the bottom of the success and failure of current railroad enterprises which are endeavoring to annex Mexico to the railroad system of the United States. With coal at hand they may succeed; without it, a period of disastrous liquidation is in store for them."

Scarcity of fuel may be an obstacle to the financial success of one or two of the many railways projected in Mexico, but this difficulty cannot apply to the Topolbampo route across the Northern States of that country.

The road commences at Piedras Negras, which very name (black-stone) indicates a deposit of coal. In the report upon the preliminary survey of this route, Mr. Simmons says that at Santa Rosa "two mines on a 7-foot vein were bonded." Also: "Later, at Piedras Negras, we heard of many other coal properties, and on the American side, at Eagle Pass, very important coal discoveries had recently been made. The question of a coal supply was forever settled. As an evidence of its abundance I may state that 200 engines, originally ordered as wood-burners by the Mexican Central Railroad, have recently been changed to coal-burners. A proposition to control the coal production of this section was introduced in a scheme to unite all the Mexican holders of these properties in one company, which should transfer its interests to ours for the sake of development. Authority was left with the Mexican consul at Eagle Pass to consult with the proprietors and perfect the arrangements of this plan."

In his report upon the same survey, Mr. Price testifies to a similar effect concerning the deposit near Santa Rosa, viz: "Near this place are situated some of the largest coal mines in Mexico—several of which are being worked—one to a depth of 220 feet. The width of the veins is from 4 to 6 feet, and can be traced for miles upon the surface. The character of the coal is bituminous and in perpendicular veins. It is

easily coked, and a great deal is now used at the smelters of the silver mines located near them."

On this subject a very useful paper was presented at the annual meeting of the American Institute of Mining Engineers in Washington, D C., February, 1882.

W. H. Adams, Mining Engineer, who had recently visited the Santa Rosa District of Northern Mexico, said as follows :

"I doubt if many of our engineers know of the existence of coal fields extending over many hundreds of miles of territory bordering on and lying contiguous to the Rio Grande river in Mexico. Essential as these facts are to those contemplating the starting of industrial works along our frontiers, yet I have not been able to learn of any surveys or examinations being made of these deposits, and I trust the preliminary and unofficial investigations made by myself of late may be found of interest, especially to those of our members whose experience has been with poor fuel, or in districts remote from railway facilities."

* * * * *

"Fortunately for metallurgists, who will hereafter make this frontier a base of operations, there has been disclosed, near to the surface, seemingly inexhaustible beds of semi-anthracite and bituminous coals.

"No extensive openings have as yet been made, and my own workings at the Cedral mines are all that can yet be said to prove the quantity and quality of the coal, other openings furnishing corroborative evidence. Our location (one hundred and ten miles west of the Rio Grande river) is on the western line of the depository basin, as existing since the period of activity along the volcanic line. Farther inland I have not examined, but much greater elevations are the rule, which, however, from the nature of their formation, are not necessarily barren ground.

"Beginning at the base of the Santa Rosa Mountains (location of the Cedral mines) we find very interesting breaks in the foot-hills, disclosing the stratified rocks from the volcanic centres to the valleys." * * *

"From their nearness to the coal measures, the mountains, which are protruded into the plains at this particular point, offer a great novelty in producing vertical veins of coal nearly anthracitic in character, which I have opened to a depth of 240 feet. Coal of a more bituminous nature is found outcropping on the rivers thirty, forty, sixty miles to the eastward, and lignites in many places over a wide extent of country drained by the Rio Grande. The inference is that the heat which changed the metamorphic rocks drove off the bitumen, and that the nearer one approaches the mountain line the better is the product."

* * * * *

"To the eastward, breaks in the horizontal strata disclose sandstone, shales, fuller's-earth, grit-stones, etc., while surface openings at several points along the Sabinas river, above ordinary water level, show veins of coal of good workable thickness and excellent quality. The amount of sulphur contained in the coal is considerable, and finely disseminated, but not so great as to require a washing operation.

"Passing farther to the east, openings have been made about Eagle Pass, in a circuit of twenty miles in Mexico, and notably at the mouth of Seco Creek. Surface indications are, however, observable over the plains at numberless points between mountain-chain and river. At Eagle Pass the Permian system undoubtedly commences, the gray and green-white sandstone showing itself in the bed of the river, and at several places along the Rio Grande river the opportunities for observation are equally perfect. Here the character of the coal changes, and lower grades of bituminous coal and shales are found in wide veins, but so mixed with clay and grit as to be of little value commercially, so far as yet developed. I cannot believe these beds to be brown coal or lignites, as generally stated, the geological formation being certainly too old for lignite; and although we have examples of good coal in the Tertiary, I know of no evidence of the presence of lignites in the Permian.

"Down the river more recent formations outerop, and in the neighborhood of San Antonio the true brown coals of woody texture are found. Without a knowledge of the lines of upheaval, which are generally easily traceable, the casual observer would not note that Eagle Pass is, say, 500 feet higher than San Antonio, with all the strata inclining towards the latter, showing the coals of Eagle Pass to belong to an older period.

"The future commercial value of this basin of coal (which underlies one of the richest agricultural districts of Northern Mexico, and adjoins a mineral chain of known large extent and exceptionable richness,) is yet to be determined. At present my own work is upon the upheaval veins, and being preparatory only, differs in no way from perpendicular vein-work of any character. The coal cokes easily, producing about 60 per cent. in weight of good coke, and while I am not now prepared to give details of analyses, yet the extended underground workings and the new bank of fifty ovens to be erected this spring will furnish, I trust, a practical demonstration, which I shall be pleased to show to travellers."

The very great importance of the coal basin here described will be appreciated when it is borne in mind that it spreads out in fan shape south of the point where the American and Mexican Pacific Railway enters Mexican territory.

Extensive coal fields are also to be found in the State of Sonora, north of the western division of the Topolobampo route. They are thus editorially described in the *Two Republics* of the City of Mexico, under date of June 26, 1881: "Great fields of anthracite coal have lately been opened in Sonora. They are said to rival the anthracite coals of Pennsylvania in quality, and to extend in one section of Sonora over a surface twenty miles in length and two miles in width. Only two of the veins have been worked so far, and they show a width of ten and seven feet, respectively, all of the purest anthracite, the upper one forming the slope of a hill, being covered only with a few feet of earth, and underlaid twelve feet distant by the second bed of equal quality. They are developed by drifts in the coal, which place at least one million tons in sight. The importance of these coal beds cannot be over-estimated."

At Chois, near the point where the Company's line enters the Cordillera, there are coal indications reported.

It should be borne in mind that these discoveries are the result of very imperfect exploration. When Northern Mexico is carefully searched for this purpose it is fair to presume that very many more deposits of coal will be found.

Coal Fields of Texas.

In Texas, also, there is an extensive deposit of coal, almost at the starting point of the American and Mexican Pacific line. It is located along the banks of the Rio Grande, southeast of Eagle Pass, and above Laredo. It is described in the *Galveston News* of April 12, 1882, as follows:

"Within less than one hundred feet of the Rio Grande, and just twenty miles above Laredo, is graded one section of the Rio Grande and Pecos road, and immediately over the road-bed a coal chute is constructed that is intended to deliver the coal directly into the cars. At this time it is emptied into wagons at the rate of thirty tons per day. Ascending a ladder to a height of thirty feet, the top of this chute is reached, and from here a tiny railroad stretches to the mouth of a tunnel entering the towering gray hill to the south at a distance of 200 feet. We noticed at its entrance a seam of coal three feet in thickness, over and underlaid by a stratum of shale and slate of an average thickness above and below of some three or four feet. Entering this tunnel, one hour was spent in exploring the coal seam it has developed, and here follows what was seen:

"The main tunnel, which is seven feet high and seven feet wide, has been opened to a distance by actual measurement, 650 feet, along which

every 30 feet tunnels of the same size have been opened both to the right and left for a distance of 150 feet, many of which have been widened into rooms twenty feet wide, leaving the customary pillars of ten feet to support the roof. At a distance of 300 feet from the mouth an air-shaft is opened from one of these wide tunnels twelve feet square to the top of the hill, 800 feet, which secures a perfect ventilation of the mine. Along the main tunnel its whole distance, 650 feet, as well as to the end of all side tunnels, is laid an iron track upon which the coal cars, drawn by mules, enter the mines and carry out the coal. By actual measurement the thickness of the vein, which, at the opening of the mine, was but three feet, has increased to four feet at the present terminus of the tunnel, and the coal seam, which was slightly mixed with foreign matter at the surface, has continued to improve until the vein at a distance of less than fifty feet from the opening has become a solid mass of cannel coal of the finest quality. The coal is got out by digging away the slate and shale from beneath it, and then blasting it down with powder: pieces weighing a half ton frequently being blown down, which have to be broken up to load on the coal cars. The dip of this vein, as far as worked, averages six inches to the one hundred feet, and the vein runs from northwest to southeast. All indications go to show that the vein is, comparatively speaking, inexhaustible. Its outcroppings along the banks of the Rio Grande demonstrate that the vein is at least twenty miles wide, and throughout the thousands of feet of side tunnels opened in the mines the vein never shows any weak points."

Coal Fields of Alabama and Georgia.

The railway lines which supplement the Mexican Pacific, and connect it with the Atlantic seaboard at Fernandina, Florida, and Brunswick, Georgia, are also well supplied with tributary coal fields. In support of this assertion we quote from a recent interview in the Atlanta *Constitution* of Mr. J. C. Kimball, a prominent coal dealer of that city. He says:

"To the general reader, as I wrote once in an article in the *Industrial Review*, the coal supply of the South is a sealed book. Writers have regarded us, or our supply, as of too little consequence to demand serious attention. Even *Appleton's Encyclopædia* gives us but a passing notice in half a dozen lines, and yet we have in the four States lying immediately south of the Ohio river, namely, Kentucky, Tennessee, Georgia, and Alabama, nearly 15,000 square miles of territory rich in thick veins of the finest bituminous coal in the country, more than four times the area of the celebrated coal fields of Pennsylvania, and twenty

times the area of the coal deposits of the six New England States."

* * * "The Appalachian coal field, covering nearly four degrees of longitude in Ohio, contracts rapidly as it runs southward through Eastern Kentucky, but broadens out again in Tennessee and Alabama. In these latter States the coal deposits cover an area of over nine thousand square miles, stretching across the entire State of Tennessee with a varying width of from 50 to 70 miles, taking in the northwest corner of Georgia, and expanding into a heart-shaped area in Alabama, over 100 miles in width, terminating in the central portion of the State, near Tuscaloosa."

* * * "In Georgia the coal beds have developed only at one point, namely, in Dade county, in the northwest corner of the State, where are located the Dade and Castle Rock mines." * * * "Of the immense coal fields of Alabama I may say a few words. Covering an area of more than 4,000 square miles, these beds alone contain coal enough to supply the entire country for a century. The beds are divided into three sections known as the Warrior, Cooke, and Cahaba fields. South of the Warrior, on the Coosa river, are extensive beds of coal known as the Coosa fields, which have been little developed for want of transportation. At the southern extremity of the coal belt, in the central portion of the State, are located the Cahaba fields, rather small in area, but producing a quality of coal that is not surpassed for domestic uses by any bituminous coal in the world. The most extensive mine in this region is the Montevallo, on the line of the Selma, Rome and Dalton Railroad, about 20 miles southwest from Calera, the junction of the Selma and Nashville railroads of Alabama" * * * "The opening of the new roads now in process of construction will result in the rapid development of those extensive coal fields, and the competition both in production and freights is sure to give us coal so cheap that it will induce investment of capital in extensive manufacturing industries."

Iron of Northern Mexico.

In the State south of the Topolobampo route, near the city of Durango, is one of the most remarkable deposits of iron ore upon the face of the earth—so remarkable, indeed, that if the report of its existence was not confirmed by abundance of reliable testimony, the reader might find cause for doubt. In an elaborate letter to the *St. Louis Republican*, under date of May 4, 1881, its special correspondent wrote as follows: "About a mile north of Durango is a wonderful mountain of solid iron ore, called the Cerro del Mercado. The ore is said to be en-

tirely free from phosphor and sulphur, and to assay from 50 to 75 per cent. of pure iron. That part of the mountain above the ground measures 5,250 feet long, 1,200 feet broad, and 702 feet high. The iron produced is so soft that it bends and twists like wax, and will bear comparison with the best Norway. An English engineer has estimated its value at \$10,000,000,000, and made the somewhat astonishing calculation that at the rate of one million tons a year it would take over 300 years to level the hill to the ground."

Ward, the official representative of Great Britain in Mexico, in 1827 said of this deposit: "Iron abounds within a quarter of a league of the gates of Durango. The Cerro del Mercado is entirely composed of iron ores of two distinct qualities, (crystallized and magnetic,) but almost equally rich, as they both contain from sixty to seventy-five per cent. of pure iron."

It has recently attracted the attention of a writer in *Harper's Monthly*, who, in an article on the railways of Mexico in the number for July of 1881, says of it in connection with the coal deposits of Sonora, as follows: "These, and the great iron mountain near the city of Durango, which is a solid mass of rich ore, seven-eighths of a mile long, 360 yards wide, and 210 yards in height, may prove sources of greater wealth than the richest silver mines."

Another remarkable deposit of iron may be found near the line of the road in the State of Coahuila. Col. Von Motz, one of the engineers of the Company, who has recently returned from a survey of the line, thus describes it: "Thirty miles due north from the Laguna de Jaco a solid deposit of magnetic iron is reported, having the same formation and facility for working as the known "Cerro del Mercado," near Durongo. An early examination of this deposit is strongly recommended, as in combination with the coal of the Santa Rosa district large industries might be started."

Iron of Alabama and Georgia.

Alabama :—In Appleton's annual Cyclopædia for 1881 is the following general statement concerning the iron deposits of Alabama: "The supply of coal and iron in the State is comparatively inexhaustible. During the last ten years the iron industry has increased about 700 per cent."

The product of pig-iron of this State in 1881 was 98,000 tons.

The New Orleans *Times-Democrat* of March 5, 1883, has an elaborate and comprehensive review of the iron deposits and industries of Alabama, from which we quote briefly as follows, after describing the Black Warrior, Coosa, and Cahaba coal-fields, it says: "In immediate con-

nexion with these coal beds are found the great iron mines of Alabama. These mines are often in great mounds on the surface of the earth, having a height of 150 feet of iron ore containing 60 per cent. of metallic iron. Yorkshire, England, has heretofore been considered the cheapest place in the world for the manufacture of iron, but their coal lies 20 miles distant from the mine. In Alabama they are often found less than half a mile apart, and frequently even closer. The cost of manufacturing iron in Alabama, even with very crude methods, is not quite as great as it is in Yorkshire, so that without a tariff of any kind Alabama iron can be put in the American market at a less cost than the Yorkshire iron, even though there were no expense of transportation or handling against it."

After describing the remarkable growth of that great iron centre of the State—Birmingham—the article continues as follows: "Its principal commercial attractions are its vast and apparently inexhaustible coal and iron ores which stretch over 35 of the northern and northwestern counties and sink to a maximum vertical depth of about 25 feet. One mile southeast of the city lies Red mountain, which contains, both as to quality and accessibility, the most remarkable deposit of iron ore yet known. The Alabama Great Southern railroad runs parallel with this mountain. Red, brown, and fossiliferous ores exist. The average per cent. of iron by analytical test is 50 per cent. The red ore on this mountain is now being mined. Red ore is delivered at 75 cents per ton, and brown ore from \$1.50 to \$2 per ton."

Georgia :—The product of pig iron in this State in 1881 was 37,000 tons. A recent "Manual of Georgia," by Dr. Janes, Commissioner of Agriculture, says of its iron deposits: "Iron ores, either hematite, limonite, or fossiliferous, are abundant throughout the northern part of the State, and found to a considerable extent in the counties of Harris and Talbot, in Middle Georgia, and in Burke, of the Southern division.

In the counties of Dade, Walker, and Chattooga, it lies side by side with large deposits of coal, thus affording ample facilities for smelting. In Barton county we find the best brown hematite, which, in combination with manganese, also abundant in that section, forms that beautiful mirror-like iron, called by the Germans *Spegelcisen*. The brown hematite is also abundant in Polk county. At the date of the last report there were in the State 20 iron foundries, with a producing capacity of 300 tons per day, and 100,000 tons of pig-iron per annum."

VII.

TRIBUTARY FORESTS.

IT would be difficult to find upon a map of this or any other country a railway destined to have so large a transportation business in timber and its manufactures as the American and Mexican Pacific, projected through the magnificent and almost untouched pineries in the Gulf States. The map on the following page gives a bird's eye view of this continuous forest. But let us examine the facts and figures as recently given by Prof. Sargeant in the forestry bulletins of the new census.

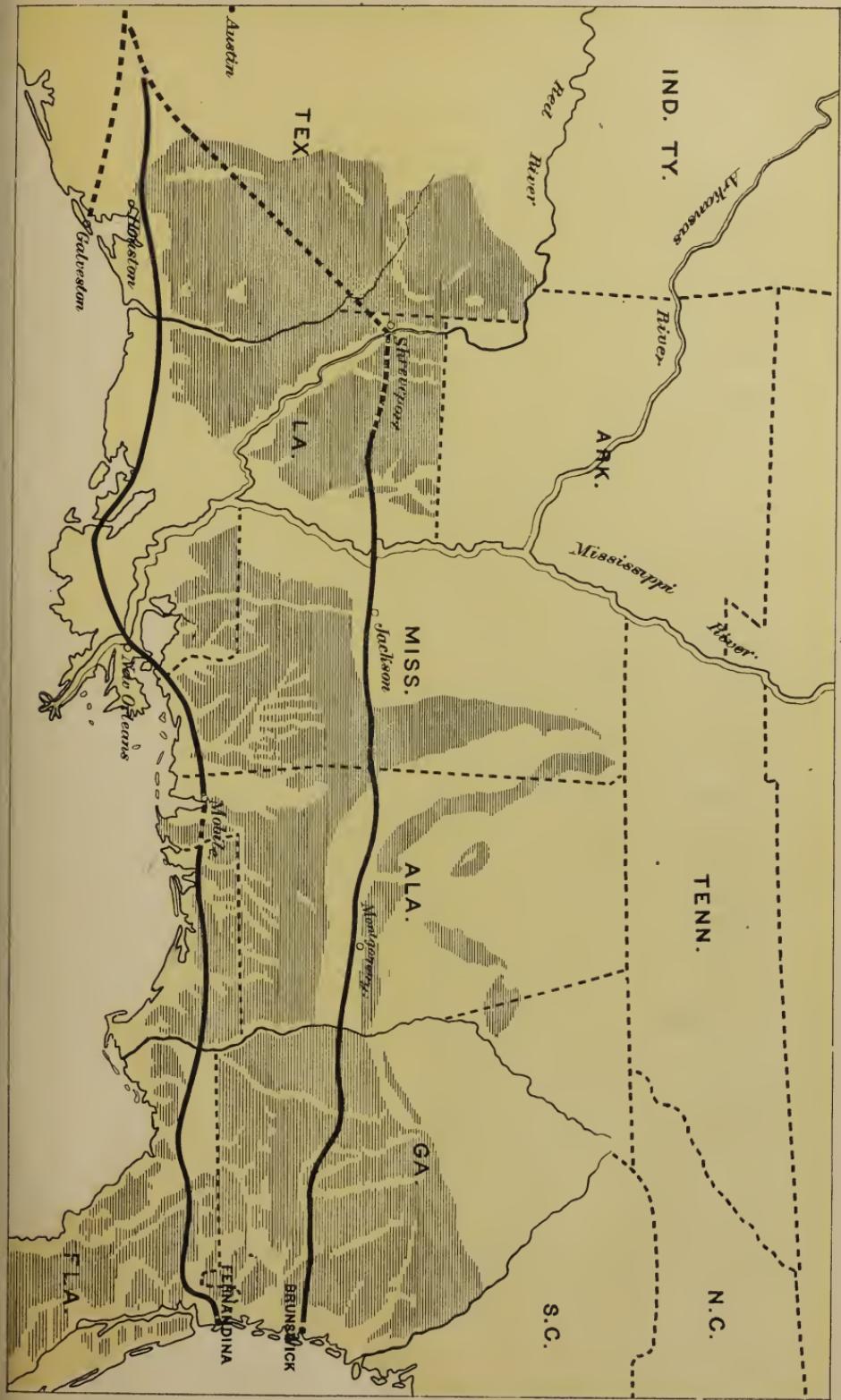
In Florida.

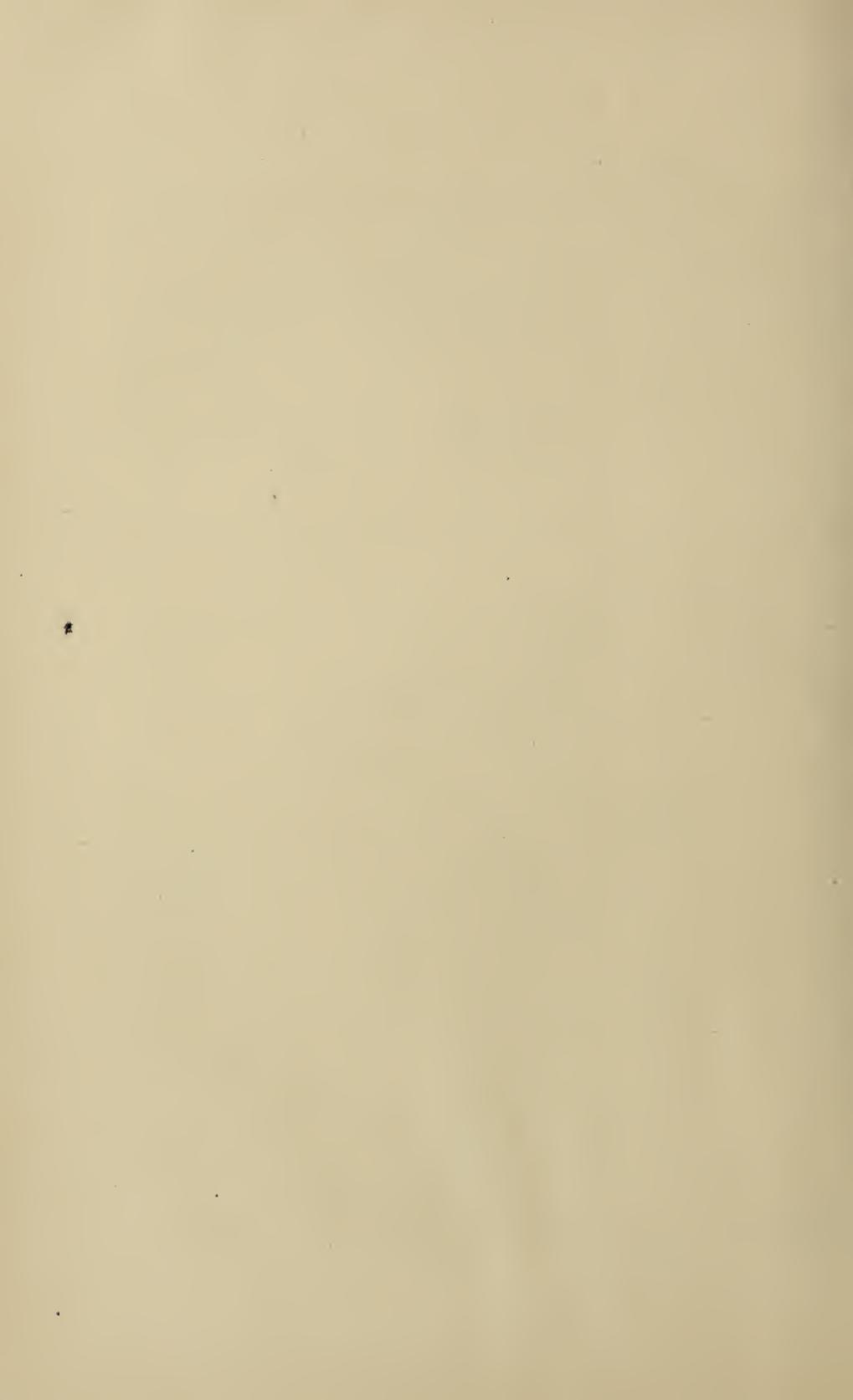
In Florida the estimated amount of merchantable *long-leaved pine* standing May 31, 1880, was as follows:

<i>Counties.</i>	<i>No. of feet (board-measure.)</i>	<i>Counties.</i>	<i>No. of feet (board-measure.)</i>
Alachua	525,000,000	Manatee	200,000,000
Baker.....	144,000,000	Marion	315,000,000
Bradford.....	138,000,000	Nassau.....	104,000,000
Brevard.....	63,000,000	Orange	87,000,000
Calhoun	81,000,000	Polk.....	210,000,000
Clay.....	77,000,000	Putnam.....	121,000,000
Columbia.....	455,000,000	St. John's.....	66,000,000
Duval	67,000,000	Santa Rosa.....	213,000,000
Escambia	90,000,000	Sumter	103,000,000
Hamilton	311,000,000	Suwannee.....	622,000,000
Hernando.....	142,000,000	Taylor.....	218,000,000
Hillsboro	162,000,000	Volusia.....	59,000,000
Holmes.....	150,000,000	Wakulla	72,000,000
Jackson.....	233,000,000	Walton.....	409,000,000
Jefferson.....	23,000,000	Washington.....	187,000,000
Lafayette.....	425,000,000	Total.....	6,615,000,000
Levy	346,000,000		
Liberty.....	75,000,000		
Madison	122,000,000		
Cut for the census year ending May 31, 1881, (excluding 77,500,000 feet, estimated, grown in Alabama and sawed in western Florida).....			208,054,000

In this estimate no account is made of timber remaining on lands which have been cut over, or of that injured by the manufacture of turpentine.

The long-leaved pine forests of central and southern Florida are less heavy than





those of the northern part of the State, and south of latitude 29° N. are of little present commercial value, although included in this estimate.

In Georgia.

In Georgia the estimated amount of merchantable *long-leaved pine* standing May 31, 1880, was as follows:

<i>Counties.</i>	<i>No. of feet (board measure.)</i>	<i>Counties.</i>	<i>No. of feet (board measure.)</i>
Appling	543,000,000	Liberty	236,000,000
Baker.....	134,000,000	Lowndes.....	236,000,000
Baldwin.....	35,000,000	McDuffie.....	10,000,000
Berrien.....	410,000,000	McIntosh.....	65,000,000
Bibb	38,000,000	Macon	52,000,000
Brooks	281,000,000	Miller	164,000,000
Bryan	60,000,000	Mitchell.....	379,000,000
Bullock.....	733,000,000	Monroe	18,000,000
Burke.....	298,000,000	Montgomery.....	791,000,000
Calhoun.....	117,000,000	Muscogee	35,000,000
Camden	82,000,000	Paulding.....	2,000,000
Charlton.....	246,000,000	Pierce.....	220,000,000
Clay.....	96,000,000	Polk.....	36,000,000
Clinch.....	350,000,000	Pulaski.....	408,000,000
Coffee.....	578,000,000	Randolph.....	126,000,000
Colquitt	339,000,000	Richmond	21,000,000
Crawford	45,000,000	Schley	28,000,000
Decatur.....	653,000,000	Screven	188,000,000
Dodge.....	417,000,000	Sumter	191,000,000
Dooley.....	334,000,000	Talbot	44,000,000
Dougherty.....	90,000,000	Taylor	53,000,000
Early.....	299,000,000	Tattnall	768,000,000
Echols.....	183,000,000	Telfair	598,000,000
Effingham.....	6,000,000	Terrell	104,000,000
Emanuel.....	956,000,000	Thomas	311,000,000
Floyd	19,000,000	Twiggs	84,000,000
Glasecock.....	17,000,000	Upson	32,000,000
Glynn.....	47,000,000	Ware	161,000,000
Hancock	76,000,000	Warren	80,000,000
Haralson.....	21,000,000	Washington.....	240,000,000
Harris.....	22,000,000	Wayne	160,000,000
Houston.....	191,000,000	Webster	48,000,000
Irwin.....	488,000,000	Wilcox	292,000,000
Jefferson.....	206,000,000	Wilkinson	152,000,000
Johnson.....	291,000,000	Worth	512,000,000
Jones.....	40,000,000		
Laurens	1,064,000,000	Total.....	16,778,000,000
Lee	128,000,000		
Cut for the census year ending May 31, 1880, excluding 28,335,000 feet cut in the region of short-leaved pine and mixed growth			272,743,000

These estimates include merchantable pine still standing on land partially cut over, or which has been worked in the manufacture of turpentine. The worked areas include nearly all the regions from which any pine has been removed, and extend beyond them in all directions into the uncut forest and along rivers and railroads.

In Alabama.

The statistics of merchantable *long and short-leaved pine* standing in this State May 31, 1880, are as follows:

LONG-LEAVED PINE.—(*Pinus australis.*)

<i>Standing Pine in Pine-belt proper.</i>	<i>No. of feet (board measure.)</i>
East of Perdido river.....	4,055,000,000
West of Perdido river.....	2,000,000,000
In the region of mixed growth.....	10,000,000,000
In the central pine-belt.....	1,750,000,000
In the Coosa river basin.....	900,000,000
In the Walker county district.....	180,000,000
Total.....	18,885,000,000
Cut for the census year ending May 31, 1880 (including 77,500,000 feet, estimated, grown in Alabama and sawed in western Florida).....	245,396,000

In this estimate no account is made of small timber standing on some 1,282,000 acres which have been cut over, and from which the merchantable pine has been practically removed, or on 600,000 acres injured by the manufacture of turpentine.

There are fewer pine trees per acre in the region of mixed growth than in the pine-belt proper, which it adjoins on the north, but the individual trees being larger, the average amount of standing pine per acre is greater, although generally of poorer quality.

SHORT-LEAVED PINE.—(*Pinus mitis.*)

Standing pine in the central pine-belt.....	1,875,000,000
Standing pine in the Coosa river basin.....	432,000,000
Total.....	2,307,000,000

Cut for the census year ending May 31, 1880, none reported.

In Mississippi.

In Mississippi the amount of merchantable *long and short-leaved pine* standing May 31, 1880, was estimated as follows:

LONG-LEAVED PINE.—(*Pinus australis.*)

<i>Standing pine.</i>	<i>No. of feet (board measure.)</i>
Standing pine in region west of Pearl river, tributary to the Chicago, Saint Louis, and New Orleans Railroad.....	6,800,000,000
East of Pearl river.. ..	7,600,000,000
Region of mixed growth, exclusive of 200,000 acres injured by the manufacture of turpentine.....	3,800,000,000
Total.....	17,200,000,000
Cut for the census year ending May 31, 1880.....	108,000,000

In this estimate no account is made of small timber standing on some 2,912,000 acres which have been cut over, and from which the merchantable pine has been practically removed.

The region of mixed growth, which adjoins the pine-belt upon the north, contains a smaller number of pine trees per acre than the pine-belt proper, but the individual trees being larger, the average amount of standing pine per acre is greater, although generally of poorer quality.

SHORT-LEAVED PINE.—(*Pinus mitis.*)

<i>Standing pine.</i>	<i>No. of feet (board measure.)</i>
Standing pine in the northeastern belt.....	1,600,000,000
Standing pine in northern region of mixed growth.....	5,175,000,000
Total.....	6,775,000,00
Cut for the census year ending May 31, 1880.....	7,775,000

In Louisiana.

In Louisiana the estimate of merchantable *long and short-leaved pine* standing May 31, 1880, was as follows :

Parishes.	<i>Long-Leaved Pine.</i> (<i>Pinus australis.</i>)	<i>Short-Leaved Pine.</i> (<i>Pinus mitis.</i>)
	No. feet (board-meas.)	No. feet (board-meas.)
Bienville	416,000,000	1,837,000,000
Bossier.....	.....	1,574,000,000
Caddo.....	.....	1,696,000,000
Calcasieu.....	4,219,000,000	.....
Caldwell.....	602,000,000	362,000,000
Catahoula.....	1,508,000,000	304,000,000
Claiborne.....	.....	1,923,000,000
De Soto.....	.....	1,971,000,000
East Baton Rouge.....	.....	157,000,000
East Feliciana.....	198,000,000	886,000,000
Grant.....	1,574,000,000	.....
Jackson.....	493,000,000	1,670,000,000
Livingston.....	300,000,000	.....
Morehouse.....	.....	797,000,000
Natchitoches.....	1,792,000,000	618,000,000
Ouachita.....	16,000,000	1,126,000,000
Rapides.....	2,422,000,000	.....
Red River.....	.....	643,000,000
Sabine	598,000,000	1,974,000,000
St. Helena.....	749,000,000	.....
St. Landry.....	579,000,000	.....
St. Tammany	1,398,000,000	.....
Tangipahoa.....	1,537,000,000	.....
Union.....	.....	2,522,000,000
Vernon.....	3,741,000,000	.....
Washington.....	1,734,000,000	.....
Webster.....	.....	1,443,000,000
West Feliciana.....	.....	122,000,000
Winn.....	2,662,000,000	.....
Total.....	26,588,000,000	21,625,000,000
Cut for the census year ending May 31, 1880.	61,882,000	22,709,000

In Texas.

In this State the estimate of merchantable long and short-leaved and loblolly pine standing May 31, 1880, was as follows:

Counties.	Long-leaved Pine. (<i>Pinus australis</i> .)	Short-leaved Pine. (<i>Pinus mitis</i> .)	Loblolly Pine. (<i>Pinus Taeda</i> .)
	No. feet (board-meas.)	No. feet (board-meas.)	No. feet (board-meas.)
Anderson .....	.....	336,000,000	1,763,600,000
Angelina	1,340,800,000	.....	1,190,400,000
Bowie .....	.....	2,380,800,000	.....
Camp .....	.....	579,200,000	.....
Cass .....	.....	2,470,400,000	.....
Cherokee .....	.....	2,230,400,000	585,600,000
Franklin .....	.....	448,000,000	.....
Gregg .....	.....	598,400,000	.....
Grimes .....	.....	.....	211,200,000
Hardin	1,244,800,000	.....	627,200,000
Harris .....	.....	.....	1,827,200,000
Harrison .....	.....	2,326,400,000	.....
Henderson .....	.....	521,600,000	.....
Hopkins .....	.....	483,200,000	.....
Houston .....	.....	.....	3,216,000,000
Jasper	2,534,400,000	.....	.....
Jefferson .....	.....	.....	288,000,000
Liberty	41,600,000	.....	2,147,200,000
Madison .....	.....	.....	233,600,000
Marion .....	.....	1,187,200,000	.....
Montgomery .....	.....	.....	2,326,400,000
Morris .....	.....	729,600,000	.....
Nacogdoches	1,216,000,000	1,555,200,000	35,500,000
Newton	2,112,000,000	.....	33,000,000
Orange	230,000,000	.....	518,400,000
Panola	1,193,600,000	1,107,200,000	.....
Polk	2,720,000,000	.....	473,600,000
Red River .....	.....	272,000,000	.....
Rusk	115,200,000	2,492,800,000	.....
Sabine	1,648,000,000	.....	.....
San Augustine	1,625,600,000	.....	.....
San Jacinto .....	.....	.....	1,833,600,000
Shelby	1,884,800,000	425,600,000	.....
Smith .....	.....	2,035,200,000	.....
Titus .....	.....	896,000,000	.....
Trinity	51,000,000	.....	1,987,200,000

Counties.	<i>Long-leaved Pine.</i> <i>(Pinus australis.)</i>	<i>Short-leaved Pine.</i> <i>(Pinus mitis)</i>	<i>Loblolly Pine.</i> <i>(Pinus Taeda.)</i>
	<i>No. feet (board-meas.)</i>	<i>No. feet (board-meas.)</i>	<i>No. feet (board-meas.)</i>
Tyler.....	2,550,400,000	.....	.....
Upshur.....	.....	1,392,000,000	.....
Van Zandt.....	.....	26,000,000	.....
Walker.....	.....	.....	1,590,400,000
Waller.....	.....	.....	19,000,000
Wood.....	.....	1,600,000,000	.....
Total.....	20,508,200,000	26,093,200,000	20,907,100,000
Amount cut during the year ending May 31, 1880	66,450,000	¹ 146,420,000	61,570,000

Summary.

The total amount of merchantable pine standing in this tier of Southern States, intersected by the American and Mexican Pacific Railway, was on the 31st of May, 1880, as follows:

	<i>No. of feet, (board Measure.)</i>
Florida.....	6,615,000,000
Georgia.....	16,778,000,000
Alabama.....	21,192,000,000
Mississippi.....	23,975,000,000
Louisiana.....	48,213,000,000
Texas.....	67,508,500,000
Grand Total.....	184,281,500,000

Contrasting the pine supply of these Southern States with that of Michigan, Wisconsin, and Minnesota the reader will observe that the merchantable standing pine of Michigan is but 35,000,000,000 feet, or but a trifle more than half that of Texas; that the merchantable standing pine of Minnesota is but 6,100,000,000 feet, or less than one-seventh that of Louisiana; that the merchantable standing pine of Wisconsin is 41,000,000,000 feet, or less than that of Louisiana, and less than two-thirds that of Texas.

¹ Including 30,290,000 shingles.

Quality of Southern Pine.

A recent bulletin published by the U. S. Census Office gives the fuel value of 55 varieties of the more important woods of the United States. They are arranged in the order of relative value by equal volumes, and in this list the Southern or long-leaved pine ranks second, (mahogany being first,) and the white pine of the Northern States ranks fifty-third, or near the bottom of the list.

In relative value, by equal weights, the Southern long-leaved pine ranks first, pitch pine second, and white oak last, or fifty-fifth. In weight per cubic foot Southern long-leaved pine is 46 22-100 pounds, or more than double that of Northern white pine, which is 21 72-100 pounds.

In Northern Mexico.

The forests of Northern Mexico are also very extensive, as may be seen by a glance of the map on the following page prepared by Col. Von Motz. Referring to the Report on the Topolobampo Reconnoissance we find the following testimony from Mr. Simmons: "At an elevation of 4,000 feet on the western slope we entered a magnificent belt of pines, and never left it till we descended to 7,000 feet on the eastern side. From the highest elevations, as far as the eye could reach, to the north and south, one sea of pines extended. There is wood enough along our line to supply ties for all the railroads in Mexico, and several parties approached us on the subject of contracting to deliver them at very reasonable prices. Besides the pine there were magnificent oaks of various kind, and in the foot-hills below the pine not less than twenty varieties of useful woods in great abundance."

Mr. Price says in his report: "The foot-hills are covered with timber of various kinds, most of the trees being large enough for railroad ties. At an altitude of 4,000 feet pines begin to grow, and the entire Sierra Madre range is covered with a forest, through which we travelled for days. There is timber enough in the mountains of Mexico to supply this continent for years to come."

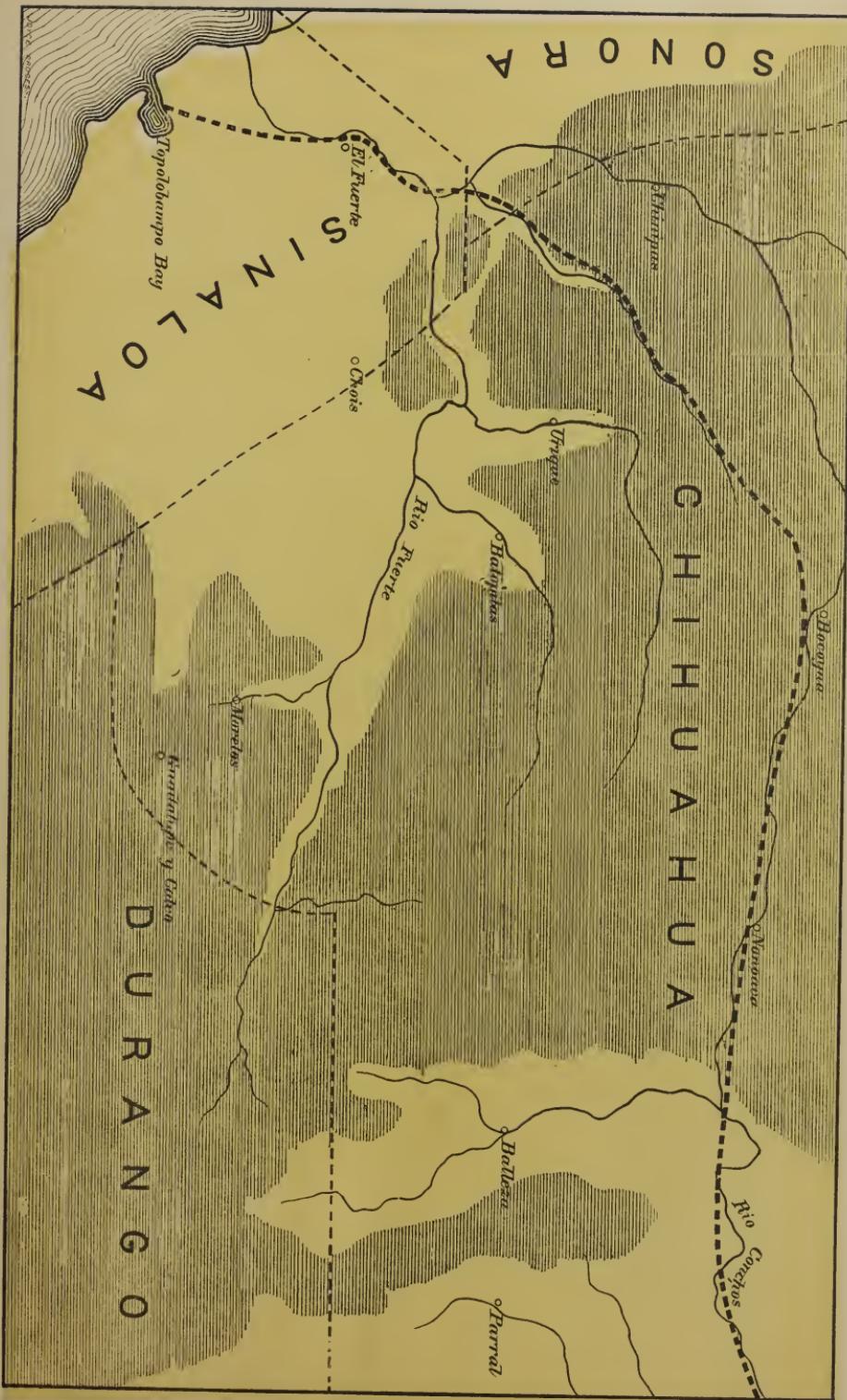
On this subject Hon. Camilo Vega, who travelled across Northern Mexico in 1876, writes concerning the region intersected by the mountain section of the railway: "Immense forests of pine and oak trees are to be found in this section, and thus fuel here for engines and other purposes will be very cheap."

Of the Pacific division of the road he writes: "There are extensive and thick forests, from which good timber can be had, among which I will mention amapa, cedar, asta, mulberry, &c., &c. The first named (amapa) is extremely hard, and can be employed with great advantage for cross-ties, being so abundant that, without the least exaggeration, there is timber enough of that class to furnish all the cross-ties needed for the whole railroad line from Topolobampo to Texas. Wood for engines is equally abundant and very cheap."

H. R. Holbrook, Esq., the engineer recently employed to locate the mountain section of the trunk-line, says of the tributary forests:

"Pine timber commences at Bachochic, a point on the Rio Conchos, 40 miles west from Monoava, and 70 miles east of the continental divide, at an elevation of 6,500 feet. It extends across the mountains westward for 200 miles (along the line) to near the mouth of the Rio Sententrión, and indefinitely to the northward and southward. It is the native

FORESTS OF NORTHERN MEXICO TRIBUTARY TO THE AMERICAN AND MEXICAN PACIFIC RAILWAY



Rocky Mountain pitch pine, the same as found in Colorado, New Mexico, and Arizona. It is rarely found much below an elevation of 7,000 feet. It is tall and straight, and there are from 30 to 100 trees per acre, about 25 per cent. of which is good sawing timber. There is some black oak timber, good size—now and then a tree. In the gulches and cañons is found the cedar. Enough can easily be obtained to supply the line with telegraph poles. It grows tall and straight."

Col. Von Motz says in his recent report to the Company:

"At about an altitude of 6,800 to 7,000 feet the pine, fir, and cedar make their appearance, covering the crest of the Sierra Madre for an average width of 120 miles. From the foot hills till at a distance of 30 miles from the continental divide, good and enough timber is found along the immediate line of the proposed railroad to supply the demands of construction, except bridging, for which the heavier timber will have to be brought from the higher part of the Sierra.

Approaching the summit, or continental divide, the growth of pine timber is dense, and covers all mountain ranges and peaks for an average width of 30 miles on the east side, and from 40 to 45 miles on the west side of the divide heavy saw timber is found averaging from 30 to 40 trees to the acre, one-tenth part of which is timber of from 24 to 36 inches diameter, belonging to the long-leaved white pine family, exceedingly fit for all domestic and building purposes. The proposed route probably passing the summit near Bocoyna, it deserves our attention to mention the enormous groves of this valuable pine timber at about 12 miles north from this place and for 20 to 30 miles west, southwest, and northwest from it; the transportation of this timber for commercial purposes will be a prominent and constant feeder for the business of the road, as the demand for saw timber and lumber as well in the plains of the plateau, as in the fertile area of the foot hills and coast-range of the Gulf of California, will be enormous."

VIII.

TRIBUTARY AGRICULTURE.

In Northern Mexico.

General Notes :—But little progress has been made in agriculture during the 362 years since Cortez conquered the Aztecs. His chief ambition, in a material sense, was the development of the mines of silver and gold. So brilliant has been Mexico's record in the production of precious metals that the general public seem to have overlooked and under-estimated her agricultural capacity. A similar mistake was made in regard to California, in 1850, when Daniel Webster said, in a speech on the subject of public lands: “I am sure that everybody has become satisfied that although California may have a very great seaboard and a large city or two, yet that the agricultural products of the whole surface now are not, and never will be, equal to one-half part those of the State of Illinois; no, nor yet a fourth part, or perhaps a tenth part.” Notwithstanding this prediction, California has, for years past, produced more wheat than Illinois, and is generally recognized as one of our foremost agricultural States. A similar surprise awaits those who are doubtful about the agricultural capacity of Mexico, if we may judge from the reports of a few writers who have examined this subject.

A very emphatic tribute to the general natural riches of Mexico may be found in Lempriere's “Notes on Mexico,” written in 1862, in which he says: “The merciful hand of Providence has bestowed on the Mexicans a magnificent land, abounding in resources of all kinds—a land where none ought to be poor, and where misery ought to be unknown—a land whose products and riches of every kind are abundant, and as varied as they are rich. It is a country endowed to profusion with every gift that man can desire or envy; all the metals from gold to lead; every sort of climate from perpetual snow to tropical heat, and inconceivable fertility.”

But to change from testimony concerning the agricultural capacity of Mexico as a whole to an examination of the productiveness of the region along and near the line of the American and Mexican Pacific Railway, we

find the following in the recent report on the reconnoissance by Messrs. Simmons, Carman, and Price.

Of the country in the State of Sinaloa, along the western division of the road, Mr. Simmons reports: "I can conscientiously say I have never seen in any part of the world such a land of magnificent bounty. To detail my impressions of the country on our journey up the valley to the city of Fuerte, the capital of the Fuerte district, would be only to repeat what I have said of this portion which is around Ahome, and I may condense the whole description of the Fuerte valley, from Ahome to the mountains, into these few words: Magnificent in beauty, unsurpassed in fertility—a land so rich and bounteous that if the proper measures (which I shall shortly indicate and have contingently provided for) to secure a sufficient amount of it shall be taken I am confident that the entire cost of the road from Topolobampo to the foot-hills of the Sierras can be defrayed from the profits which will accrue to the Company from future land sales."¹

Of this same section Dr. Carman reports: "Near the river Fuerte, at Ahome, as well as in the villages which we visited, * * * and up to the city of Fuerte, we found wherever irrigation was adopted the finest crops of corn, sugar-cane, and cotton that I had ever seen. Cotton is planted, I am told, only once in many years, and we saw large fields which are said to be five and seven years old. These yield two and three crops annually. We saw in the same field plants in blossom, pods and ripe cotton which was being picked. The corn-fields were very large and prolific. Coffee was also growing in small patches, but producing well; some we found with fruit, the berries resembling cherries, the grain well formed. Tobacco was also planted in some places, and is of good flavor. Vegetables and fruits, peculiar to these latitudes, were in abundance. Potatoes grown here were excellent, though small. Oranges, guayavas, bananas, and plantains were plentiful and of rich flavor. Beans produce largely and are of good size. Flowers of every kind flourish."²

Mr. Price pays a similar tribute to this section in his report, viz: "No section of the world can surpass the Fuerte river valley for agricultural pursuits. The soil is deep, and sugar-cane and cotton produce from three to six crops from one planting. Coffee is now being planted with success, and cereals of almost every kind yield abundant harvests. As the fields are irrigated the crops are surer than where rain is depended upon."³

¹ See Report, p. 10.

² See p. 25 of Report.

³ See p. 40 of Report.

In a private letter to the projector of the Topolobampo Railway the United States consul, residing on the west coast of Mexico, says of Sinaloa : "The soil is remarkable for its fertility, and I doubt if there is a State in the American Union which can compare in that respect with the State of Sinaloa."

Of this same State the United States consul, residing at Mazatlan, reported to our State Department in 1871 : "The richness of the soil of this State is undeniable. Cotton, sugar-cane, coffee, tobacco, wheat, corn, and beans are all grown in the State." * * * "All that is wanting is good husbandry to make it one of the richest of States."¹

Sonora is another State partially intersected by a branch of the American and Mexican Pacific road. Of it Wilson, who travelled through Northern Mexico about 1853, said in his work on "Mexico and its Religions" as follows : "It is like the land of the blessed in Oriental story. California does not surpass it in fertility or in climate. With industry and thrift it could sustain a population equal to that of all Mexico. The table-lands and the valleys are so near together that the products of all climates flourish almost side by side."²

Of the State of Chihuahua, through which the main line of the road passes, Dr. Wislizenus reported : "Agriculture, as we have seen, is the least promising branch of industry. The want of more water-courses, and the necessity of irrigation, are the principle causes ; but, nevertheless, they raise every year more than sufficient for their own consumption, and failure of crops, with starvation of the people, is less common here than in many other countries, because the regular system of irrigation itself prevents it."³

Of eastern Chihuahua and Coahuila, which States are intersected by the eastern division of the road, Hon. Camilo Vega, member of the Mexican Chamber of Deputies from Sinaloa, writes : "There you have extensive and rich haciendas, with thousands and thousands of cattle, horses, &c., and with extensive fields, where wheat and cotton grow alike luxuriantly. In the haciendas of the State of Coahuila, besides wheat and cotton, the sugar-cane and the grape are cultivated with great success—the wine of Parras and Cuatro Cienegas being the very choicest made in the country."

Cotton :—An official report to the State Department in 1880, by U. S. Consul-General Strother, enumerates as the principal cotton producing States of the Republic the following : Vera Cruz, Guerrero,

¹ Commercial Relations for 1871, p. 912.

² Mexico and its Religions, by R. A. Wilson, p. 383.

³ Senate Doc., No. 26, 1st sess. 30th Cong., p. 83.

Chiapas, Oaxaca, Colima, Michoacan, Jalisco, Sinaloa, Sonora, Chihuahua, Durango, and Coahuila.

It will be observed that five of these States are tributary to the American and Mexican Pacific Railway.

Of Sinaloa he reports as follows: "The estimated annual crop of this State is 1,700,000 pounds. The average yield per acre is estimated at 1,050 pounds; of seed, 700 pounds; of pure fibre, 350 pounds. The seed is used for fuel at the gas-works—one-third cotton seed and two-thirds coal. It is also used for cattle feed, and sold at 75 cents per quintal. Average wages of laborers, 50 cents per diem, and in remote localities 25 cents and maintenance. The American steam cotton-gin called the Eagle is the only machine used in this district. There are three cotton factories in operation in Sinaloa, but the whole crop of this State, two-thirds of that of Sonora, and considerable importations from Guerrero, all combined do not suffice fully to supply the mills. The crop in this region suffers from superabundance of rain and insects, and is considered very uncertain.

Of Sonora he reports: "The crop of this State averages about 1,000,000 pounds per annum, and the responses to other questions the same as in Sinaloa."

Of Durango he reports: "The annual product of this State is estimated at 4,000,000 pounds, the product per acre at 1,500 pounds, yielding 420 pounds pure lint. The American (Eagle) steam gin and some few horse-power gins are the machines used for cleaning the cotton. The seed is used for heating steam boilers and feeding cattle. Laborers wages, nominally 75 cents per diem, but being paid in high-priced goods are equivalent to not more than 30 cents in cash. Cotton gatherers are paid from 12½ and 25 cents per arroba, (25 pounds,) and an active man can gather six arrobas in a day. The crops suffer very seriously from the attack of vermin, such as worms, locusts, and pocks, (viruela.)

Of Coahuila he says: "The annual production of this State is estimated at 3,000,000 pounds. Last year's crop being a partial failure did not probably exceed 1,250,000 pounds; machinery, wages, and other details same as in Durango. In the Laguna, cotton is perennial and does not require to be planted oftener than once in ten years. This district, containing about 1,200,000 acres, lies partly in Coahuila and partly in Durango, is of extraordinary fertility, and well adapted to cotton, but is very little cultivated, and the cotton product of Coahuila is diminishing yearly."

Of Chihuahua he makes no report.

Wheat and Corn:—Baron Humboldt, who spent several years in Mex-

ico near the beginning of the present century, says of one section of the table-lands near the centre of that Republic : "The wheat harvest is thirty-five and forty for one, and several great farms can reckon fifty or sixty to one." * * * "At Cholula the common harvest is from thirty to forty ; but it frequently exceeds from seventy to eighty for one. In the valley of Mexico the maize yields two hundred, and the wheat eighteen or twenty. I have observed that the numbers which I here give have all the accuracy which can be desired in so important an object for the knowledge of territorial riches. Being eagerly desirous of knowing the produce of agriculture under the tropics, I procured all the information on the very spots, and I compared together the data which I was furnished by intelligent colonists who inhabited provinces at a distance from one another. I was induced to be so much the more precise in this operation, as having been born in a community where grain scarcely produces four or five for one, I was naturally more apt than another to be disposed to suspect the exaggerations of agriculturists." Of the portion of Mexico, near Celaya, he wrote: "The agriculturists showed me the enormous difference of produce between the lands artificially watered and those which are not. The former, which receive the water of the Rio Grande, distributed by drains into several pools, yield from forty to fifty for one, while the latter, which do not enjoy the benefit of irrigation, only yield fifteen or twenty."

After describing in detail the wheat capacity of New Spain, viz., the country comprising present Mexico and the territory ceded by her to the United States in 1848 and 1853, he reaches the following general conclusion : "We shall collect into one table the knowledge which we have acquired as to the mean produce of the cerealia in the two continents. We are not here adducing examples of an extraordinary fertility, observable in a small extent of ground." * * * "But in treating of agriculture in general, we speak merely of extensive results, of calculations in which the total harvest of a country is considered as the multiple of the quantity of wheat sown. It will be found that this multiple, which may be considered as one of the first elements of the prosperity of nations, varies in the following manner : Five to six grains for one in France, according to La Voisier and Neckar." * * * "This is also the mean produce in the north of Germany, Poland, and, according to M. Rühs. in Sweden." * * * "Eight to ten grains for one in Hungary, Croatia, and Sclavonia, according to the researches of M. Swartner." * * * "Seventeen grains for one in the northern part of Mexico." * * * "Twenty-four grains for one in the equinoctial region of Mexico."

He also adds: "The Mexican wheat is of the very best quality, and it may be compared with the finest Andalusian grain." * * * "In Mexico the grain is very large, very white, and very nutritive, especially in farms where watering is employed."

In this connection it may be stated that the Mexican wheat and flour, like that of Virginia and Tennessee, will cross the equator in perfect condition.

Of Mexico's capacity for corn, Ward, the British minister to that country, wrote in 1827: "There are few parts, either of the *Tierra Caliente* or of the table-land, in which maize is not cultivated with success. In the low hot grounds upon the coast, and on the slope of the Cordillera, its growth is more colossal than in the table-land; but even there, at seven and eight thousand feet above the level of the sea, its fecundity is such as will hardly be credited in Europe."

What we have just quoted about the general capacity of Mexico for the production of cereals may be applied with double force to the States of Sinaloa and Sonora, intersected by the proposed branch of the Mexican and Pacific Road, extending from Alamos to Mazatlan, for we will venture the prediction that they will soon rival California in these products.

Grazing:—The official representative of the United States residing at the city of Chihuahua reported to the State Department, in 1871, concerning the State of Chihuahua: "The State is particularly adapted to stock raising; the warm climate and very mild winters afford great advantages in this branch of business." * * * "There are, at this time, very near eight hundred thousand sheep, and very near two hundred and fifty thousand cattle in the State."¹

Dr. Wislizenus reported of the Territory of New Mexico and the State of Chihuahua, as follows: "As a grazing country both States are unsurpassed by any in the Union. Millions of stock can be raised every year in the prairies of the high table-land and the mountains. Cattle, horses, mules, and sheep increase very fast, and if more attention were paid to the improvement of the stock the wool of the sheep alone could be made the exchange for the greatest part of the present importation."²

Of eastern Chihuahua, and Coahuila, through which region the eastern division of the road is projected, Hon. Camilo Vega writes: "The lands in this section are unexcelled for raising cattle, horses, mules, and sheep."

In Our Southern States.

Cotton:—The cotton crop of the whole United States for the year

¹ Commercial Relations for 1871, p. 898.

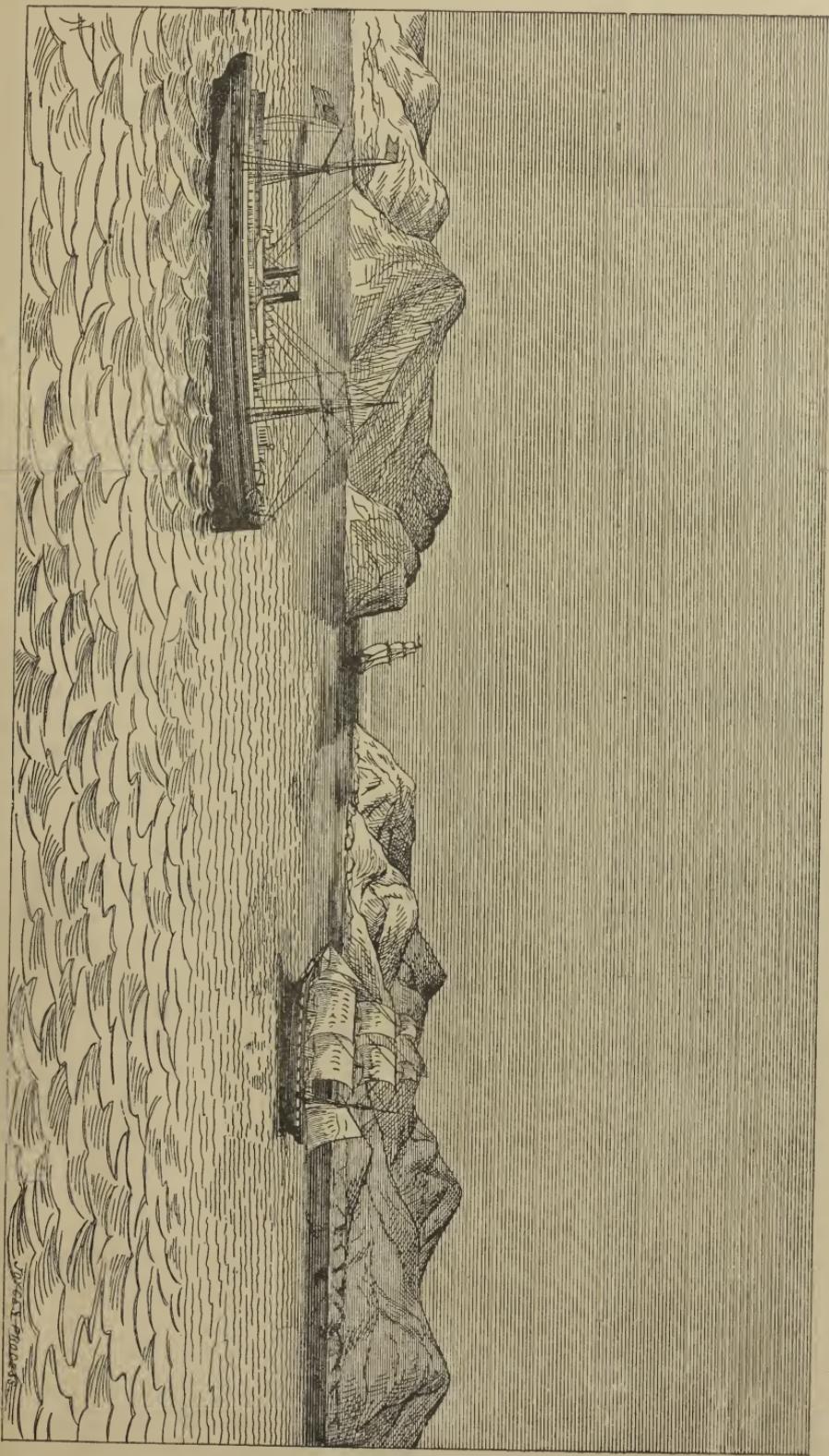
² Senate Doc. No. 26, 1st sess. 30th Cong., p. 83.

1882 was, according to the recent estimate of the Department of Agriculture, 6,800,000 bales, of which two-thirds or 4,672,000 bales were produced in the States intersected by the American and Mexican Pacific Railway. The details are as follows:

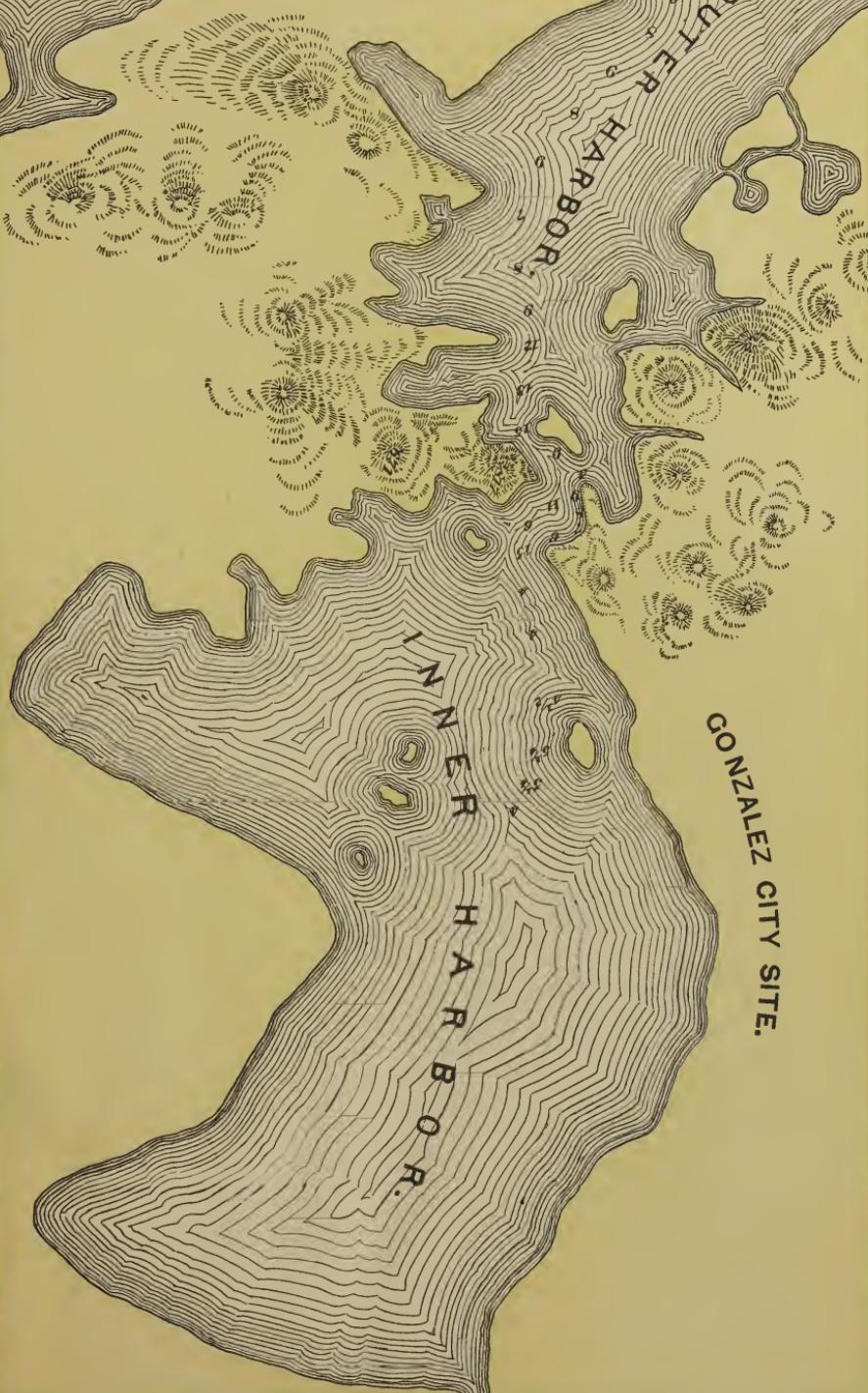
	<i>Bales.</i>
Florida.....	61,000
Georgia	920,000
Alabama.....	784,000
Mississippi.....	1,042,000
Louisiana.....	539,000
Texas	1,326,000

Sugar :—About the only good sugar lands of the United States are those in Texas and Louisiana near the line of the railway under consideration. Of Louisiana it is needless to speak, for its sugar product is well known and the only one regularly reported in the statistical reports of the U. S. Department of Agriculture. But the sugar lands of Southern Texas, in the very counties intersected by the branch of the American and Mexican Pacific Railway extending from Eagle Pass to Galveston, are not so generally known. The Galveston *News* of Sept. 1, 1882, thus describes this sugar district: “The sugar bowl proper comprises the four counties of Brazoria, Fort Bend, Matagorda and Wharton, all having the richest lands in the world. There are many who claim that the sugar belt is much larger than this and stretches over the coast country, comprising the counties of Orange, Jefferson, Liberty, Chambers, Harris, Galveston, Jackson, Calhoun, Victoria, Refugio, San Patricio, Aransas, Nueces, and Cameron, together with the four counties first named. It embraces 21,817 square miles of territory. But the purpose of this article is to call attention strictly to the sugar-bowl proper, and to give a history of its boundless resources in general, and of the sugar interest in particular. The number of square miles in these four counties are estimated at about 5,000, and the number of acres at a little over 3,000,000. About one-third is bottom land, and capable of raising from one to three hogsheads of sugar to the acre, with two barrels of molasses to each hogshead of sugar. The country is very thinly settled, and the plantations have not been handled properly since the war. In the year 1879 there were produced about 5,664 hogsheads of sugar in Brazoria county, and about 12,244 barrels of molasses, valued at about \$450,000. If this land was all planted in sugar it would yield about twice the amount of sugar and molasses now consumed in the United States.”

ENTRANCE TO TOPOLOBAMPO HARBOR.—(Inner Harbor.)



GULF OF CALIFORNIA



IX.

TOPOLOBAMPO HARBOR AND CITY SITE.

Description of Harbor.

TOPOLOBAMPO HARBOR is in the State of Sinaloa; its entrance from the Gulf of California being at north latitude $25^{\circ} 32'$. It has been thrice surveyed by the United States. An elaborate chart of the harbor has been published by the Navy Department, from a survey made in 1874 and 1875 by Commander Geo. Dewey and other officers of the U. S. ship *Narragansett*. It is composed of two bays, the outer one called Topolobampo, and the inner Oguira, or San Carlos. In the journal of Commander W. T. Truxton, U. S. Navy, who surveyed it in 1869, we find the following: "The anchorage outside is perfectly safe, as a ship could always lie off shore with a southeast wind should it begin to blow. Inside Topolobampo vessels are entirely protected from the sea, while only southwest and northwest winds would be felt. In San Carlos vessels would be entirely land-locked. In fact, for safety, no more secure anchorage is to be found; while, with the aid of two or three buoys, access to it could be made perfectly simple—more so than to most of the harbors on the coast of the United States south of Boston."

Its area and anchorage are thus described by Mr. Owen, the projector and chief engineer of the railway: "Topolobampo harbor is 18 miles long and from 1 to 6 miles wide, consists of two great basins connected with a strait—the Straits of Joshua—and contains 54 square miles of water area, 12 square miles being from 21 to 90 feet deep. The depth on the bar at low water is 21 feet, and the tides rise from 4 to 6 feet."

* * * "San Diego, California, has an anchorage area of 6 square miles, or one-half that of Topolobampo, while New York, Jersey, Hoboken, and Brooklyn cities, with a water frontage on the Hudson, East, and Harlem rivers, all combined, have but $12\frac{1}{2}$ square miles of anchorage, or but one-half square mile more than the deep and mountain-locked anchorage of Topolobampo."

Mr. Simmons, who visited the harbor in April of the present year, says in his report of the railway reconnaissance: "I am familiar with many of the finest harbors in the world, but for natural beauty I know

of none that excel, and few that equal, the Bay of Topolobampo." * * * "The exquisite beauty of the harbor, the exact correspondence of our soundings with the chart measurements, the abundance of game, the great charm of the place, had wrought us to such a pitch of enthusiasm that we spoke of everything in superlatives, and agreed that the harbor of Topolobampo was one of the most beautiful in the world, and I see no reason to modify in the slightest degree my original opinion."

Mr. Simmons publishes in his report a letter from a sea captain, Geo. Davis, in which is the following reference to the harbor: "In the month of July, 1872, I came from San Francisco in a vessel of my own, and by advice of Mr. David Turner, American consul of La Paz, Lower California, I entered this harbor of Topolobampo. When I came to the Farrallan Island, a large rock, situated about W.S.W. from entrance to the port, I was troubled to know where the channel lay, as I expected to find it by the surf; but as the sea was perfectly smooth on the bar, I took my boat and started out ahead to sound, and easily found a good, wide channel, carrying from six to seven fathoms, until past Las Copas Island, and from there it deepened to 15 fathoms, with excellent holding ground for anchorage."

In a recent lecture on the State of Sinaloa, by Frederick Weidner, M. & C. E., Surveyor-General of Sinaloa, delivered before the Geographical Society of the Pacific, at San Francisco, Nov. 15, 1881, he alludes to the harbors in the following terms:

"Nature has provided the coast of Sinaloa with many bays and large estuaries; and from amongst them fourteen are used for harbors, shipping, and landing places. The Topolobampo harbor, although unfrequented now, is considered generally the most beautiful, the safest, and best situated of all. Mazatlan, at the very entrance of the Gulf of California, is actually the first and only port of entry in Sinaloa, and as regards its importance, the second one of the Republic. But its soundings are not deep enough to allow large vessels to come in and find a secure roadstead against the southwest and northwest winds. Vessels are obliged to anchor outside the harbor and take refuge in the open sea whenever a heavy wind sets in."

In a recent communication Mr. Mareno, Government Engineer of the railway, says of the entrance to the harbor as follows:

"I hereby state that Topolobampo bars is of movable sands, and that at low tide it has a depth, at the most dangerous places—that is say, where sands accumulate, never less than $3\frac{1}{2}$ fathoms.

This case is very rare, and in order that such a thing may take place it

is necessary that a very heavy gale blows. The depth at the bar is generally from 4 to 6 fathoms."

Col. Von Motz, who has just returned from the line of the road, says of the harbor: "In arriving at Topolobampo harbor we were magnetized by the majestic aspect of this future depot of commerce; the grandeur and quietness of nature were impressive." * * *

"Being acquainted with the depths of the harbor itself, we got reliable information about the bar, bringing the depth there at about 4 to 5 fathoms during 4 months of the year, and about 7 to 8 fathoms for 8 months of the year, subject to local winds at the coast. Rise and fall of tide about five feet on the average."

U. S. Consul David Turner, residing at La Paz, in a letter to the projector of the railway, writes: "Topolobampo would be far better situated for a large city than either Guaymas or Mazatlan, as from it the interior would be accessible, while from Mazatlan it is almost impossible, to get a good road into the interior, as from that point the Sierra Madre are almost impassable, and, besides, Mazatlan is only an open roadstead and cannot be made a good harbor without an expenditure of many millions. In September last two brigs went ashore and went to pieces at Mazatlan, and there is no escape for a vessel which is caught there in a southeaster—a wind which is very prevalent four months in the year. Guaymas is too far north, and although it may always have the trade of the northern part of Sonora it is shut off from the trade of Chihuahua by the impracticability of the roads." * * * "I have never entered the harbor, but am told by Captain Preble, U. S. N., and others who have examined it, that it is easy of access, a safe and secure harbor, and can be entered by vessels drawing 20 feet of water, and, in my opinion, its location, good harbor, and other advantages indicate the right place for the most important city on the west coast of Mexico."

Description of City Site.

As may be seen by a reference to the map of the harbor, the city site at the terminus of the railway is on the north side of the inner bay. It has a water-front of about $7\frac{1}{2}$ miles, and an average width of about 3 miles, comprising an area of about $22\frac{1}{2}$ square miles. The plan of the city, as prepared by Mr. Owen, may be seen by reference to the following page. In the recent reports on the reconnoissance of the railway we find the following:

Mr. Simmons reports: "The point selected as a city site is slightly elevated above the surrounding country, sufficiently to insure a system of drainage—a matter which I did not find had been considered in any Mexican city, town, or village we visited. As the city site lies to-day, it is in the most primitive condition, but viewed by comparison with the beginnings of many rich cities of the Old and New World (notably St. Petersburg, Berlin, and Chicago) there is no reason to doubt that skill, capital, and enterprise will be able to render it speedily habitable."¹

Dr. Carman reports: "On the inner harbor, after passing the straits, there is on the northern side a large extent of level land that, close to the rocky and mountainous straits, is low, and overflows in places through sloughs that enter from the lower bay, and which may be filled up; but further on, to the east of the straits a mile or more, the land rises and does not overflow. Here is the true site to build a town; the centre should be near and around a hill called Mapau, on the water's edge. The place is to-day in its primitive condition; it is wild, grand, beautiful, capable of being modelled into a useful and ample port. Nature having provided it with every advantage, art must come in and fit it for the uses and conveniences of commerce." * * * "The entire southern border of both bays is lined by a range of low mountains, sloping to the water's edge, and rising in places to an altitude of several hundred feet, thus affording a magnificent view, and offering a cool retreat for summer villas."²

Mr. Price reports: "The northern shore, where the Fuerte river formerly emptied into the bay, is low and marshy, but the abundance of stone in the immediate vicinity will make the filling in of this comparatively cheap. The other lands covered by the town site are high and well drained, and altogether they form a beautiful situation for a large city. The formation around the bay being porphyry, there will be no trouble in getting good foundations for building purposes."³

¹ Report of Survey, p. 9.

² Ditto, p. 24.

³ Ditto, p. 34.



GONZALEZ CITY.

Mr. Owen, the projector of the railway, says in a published letter to Hon. Camilo Vega: "Topolobampo, like Acapulco, is an extinct crater, and is markedly picturesque. The mountains on the south shore rise immediately from the water's edge to a height of about 800 feet. The Peak of Joshua, on the south side of the Straits of Joshua, is reported by Commander George Dewey, U. S. Navy, to be 876 feet. Hills of porphyry 200 to 400 feet high stand on the north side of the said straits, and immediately back of these there are buttes of porphyry rising 400 feet to 897 feet above the bay, while the north shore of the inner basin—sometimes called San Carlos, and at others Oguira Bay—is a plateau stretching 18 miles to the Rio Fuerte and fronting the harbor with a shell bluff about twelve feet or more above high water. Standing on the site of Gonzalez city, which fronts for $7\frac{1}{2}$ miles on the shell bluffs just spoken of, and which is already laid out and mapped, and which contains $22\frac{1}{2}$ square miles of area * * * and the largest public reservations and parks in any city yet planned, we may look across the San Carlos Bay to the south—at this point six miles wide—and to the west and enjoy a panorama of mountain and bay which for grandeur and picturesqueness are not surpassed in any part of the world."

Climate :—Mr. Owen says of the inner bay in the letter just referred to: "The atmosphere is marked for its clearness, and the temperature at noon is never below 52° nor above 86° winter or summer."

Col. Fitch, who has for many years past resided upon the west coast of Mexico, and who is familiar with the Topolobampo harbor, writes that it has "a climate unrivalled in the world, partaking of both the torrid and temperate zones."

Back Country.

Hon. David Turner, U. S. consul at La Paz, Lower California, writes of Topolobampo: "It has the finest back country in the world, and I have been with carts 80 miles on natural roads. A city founded there would almost kill Guaymas and Mazatlan—for a short time at least; but in the long run there is plenty of room for all of them, and there will be plenty of business if peace and quiet prevail and the resources of the country are developed." By referring to previous pages of this brief the reader will find, in the notes on the precious metals and the agriculture of the Fuerte valley, much more evidence upon this point. Suffice it to say that few cities are blessed with a back country so rich in agriculture, silver, and gold as that extending from Topolobampo harbor back to the mountains near the eastern border of the State of Sinaloa.

Gulf Surroundings.

The resources of the waters on the west of Topolobampo are as remarkable as those on the land on the east. The Gulf of California is filled with natural riches which, when developed, will become a perfect bonanza to a city located upon its shore.

J. Ross Browne, the first United States Commissioner of Mining Statistics, in his work entitled "A Sketch of the Settlement and Exploration of Lower California," has supplied the public with much valuable information concerning the characteristics and resources of the Gulf. After reviewing the various explorations, &c., of this part of the Pacific, he adds: "Having in the preceding notices given a sketch of the sea-shores and islands, and of the succession and precession of discoveries and navigations of Baja California, from the earliest records in 1532 to the present, (1857,) we shall now touch summarily on the extraordinary and wonderful wealth of animal life of its marine waters. From all the accounts, histories, and voyages we have quoted, and from the uniform testimony of those more recently who have personally had knowledge of these matters since the discovery of gold in Upper California, it would appear to excel any portion of the world in the wondrous fertility of its fisheries. As early as 1537 and 1539 the infinite number of whales, seals, and fur-otters, of numberless varieties, were noted by Ulloa, who first completely navigated the shores of the peninsula from the mouth of the Colorado to Cape San Lucas, and thence on the ocean coast up to Cedros Island. Then all kinds of shell-fish, or mollusca, and of crustacea, such as lobsters, crabs, crawfish, &c., number by the thousand of species and all in great abundance, and of excellent edible qualities, as well as the family of turtles. The proper family of fishes of all known genera are found in every bay and harbor in such extraordinary quantities, and of such excellent dietetic qualities, as to have been remarked by every navigator or writer we have mentioned or read of, and it is to the present time a matter of wonder to every visitor to Lower California. Except the mollusca, cetacea, and phocidea, this great field of nature has been but little explored by the naturalist, leaving in the true fishes vast numbers to be yet added to the stores of science and human utility. Many of the fishes and shells are not only very curious, but of extraordinary beauty, and highly prized by connoisseurs." * * * "It is, therefore, evident that the fisheries of this country are to become a world of wondrous wealth to its future inhabitants—of incalculable benefit to the laboring classes in reducing the cost of living and rendering them independent of the cruel exactions of capital or the fickle

wheels of commercial prosperity or depressions. There can be no doubt that the finest varieties of our edible oysters could be bred and cultivated to supply all the Pacific domain forever, as doubtless could be done with the pearl oysters—as is the case in some parts of the Oriental World—and the same holds good with the cultivation of sponges, which is an extremely valuable business on the shores of the Grecian Archipelago. The real tortoise-shell turtle is also found on both coasts of the peninsula, and the different species of the edible turtle are particularly abundant, and in many places so easy of access as to be had for the trouble of capture, and are frequently brought to San Francisco.”¹

On a subsequent page he says: “Pearl oysters are not found everywhere on the coast, but intercalate at intervals, preferring well-sheltered bays or harbors, where fresh water empties; but this rule is not inviolable. They are met with for over 1,000 miles of shore line between Magdalena and around the Cape, and all the way up the Gulf, north above Angel Guardian Island, and the missionary writers state that after hurricanes they are known to have been thrown up on the beaches by the car-load.” * * * “Ordinary pearls are always abundant every year, but extraordinary sizes and colors are very rare. The most splendid of the pearls in the Spanish *regalia* were brought from the Gulf of California before Napoleon’s invasion, and they had always been in high demand in Spain since the days of Cortez. An American minister, in 1863, says that some of these pearls were as large as pigeons’ eggs, and were among the most valuable jewels in the crown *regalia*.²

On another page he says: “There are stated to be guano deposits on several of the islets and rocks of the upper Gulf sections, where myriads of sea fowl congregate; and as rains are infrequent there, the quality is doubtless profitable to work.”³

Of Carman Island, which is directly across the Gulf from Topolobampo harbor, he says: “It contains, beyond all dispute, the richest, most peculiar, and most accessible salt-mine in the world, and entirely inexhaustible. The Jesuits, about 1730, asked from the Viceroy a grant of this mine in perpetuity, from which they would maintain their California establishments free of cost to the King’s treasury.”⁴ This deposit becomes of great importance in connection with the fishing industry, which railway transportation from the Gulf is bound to stimulate.

The above statement by Mr. Browne about the value of the pearl fish-

¹ A Sketch of the Settlement and Exploration of Lower California, p. 48.

² Ditto, pp. 62 and 63.

³ Ditto, p. 64.

⁴ Ditto, p. 8.

eries is more than confirmed by a recent editorial in the *Mexican Financier* of January 13, 1883, as follows : "The pearl fisheries near La Paz, in Lower California, are not a recent industry, though they have recently attracted great attention. For more than twenty years they have been pursued in a quiet and somewhat unsystematic manner; but have been the means of very large wealth to many families who have controlled the riparian rights. Some remarkable pearls lately found there have excited much interest. Three such extraordinary events have taken place during the past month. Probably the largest pearl on record, weighing 75 carats, was found towards the close of December. The fisherman sold it on the spot for \$14,000, which, however, was an insignificant sum compared with its real value. Now comes the announcement that one of the fisherman employed has just discovered a finely tinted and perfectly formed pearl weighing 47 carats, and valued on the spot at \$5,000 ; while yet another pearl was found about the same time, smaller than the former, but of perfect shape, weighing 40 carats and valued at \$3,000. We have already remarked that American buyers have hitherto strangely ignored that promising district; but large European houses are represented by resident agents, under whose purchase all the products of these fisheries are shipped to European markets."

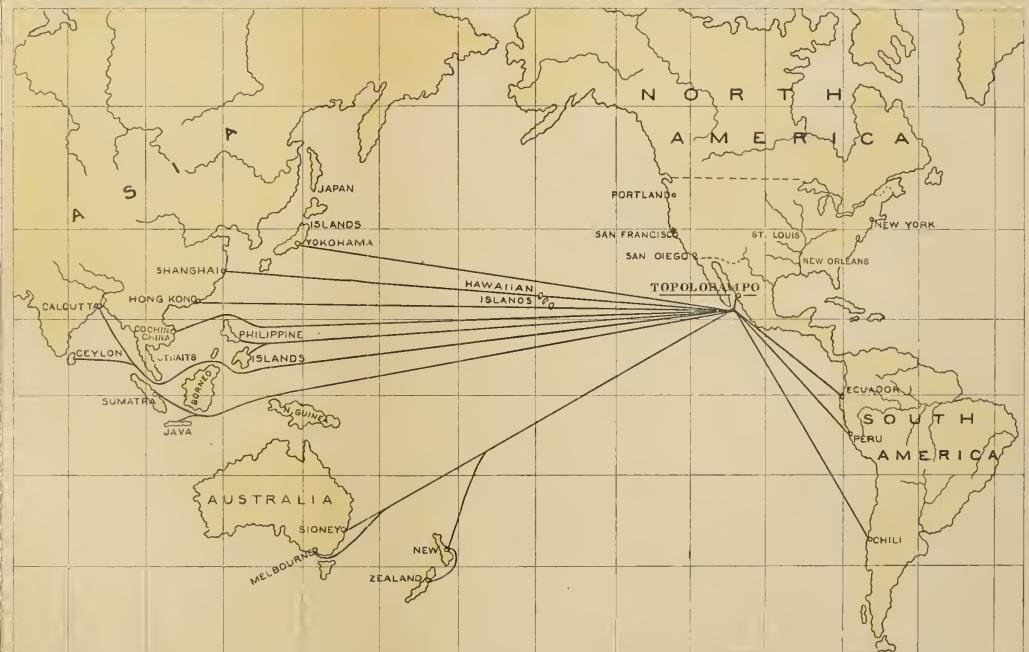
Mr. Owen, writes : "There are inexhaustible quantities of the finest oysters found in all sections of the eastern coast of the Gulf of California. Those of Guaymas, Navachista, Altata, and Mazatlan are well known and are equal in flavor and size to any found in the Chesapeake. Those of Altata are as remarkable as the celebrated Lynn Haven Bay oysters for size and fatness. The Chinese have during the past year been canning oysters, fish, and turtles near Mazatlan, and sending them to San Francisco ; and as the interior of Mexico is devoid of fish of every kind, and the people there are Catholics, this industry when railway transportation is supplied must become of vast importance."

In this chapter we have invited the attention of the reader to the local surroundings of the harbor and city site. If, in connection with these advantages, we bear in mind that the city is the natural outlet for one of the richest silver countries in the world, the terminus of a great transcontinental railway, and a most desirable starting point for the foreign commerce of the South Sea, the conclusion naturally follows that Gonzalez City is destined to become one of the greatest cities upon the Pacific coast.

**Total Annual Foreign Commerce with
All Nations.**
(Exports and Imports Combined.)

	Dollars.
Japan.....	\$5,230,000.....
China.....	198,000,000.....
Hawaiian Islands.....	7,524,595.....
Hong Kong.....	112,000,000.....
French Cochin China.....	31,000,000.....
Philippine Islands.....	34,763,000.....
Ceylon.....	46,852,000.....
Straits Settlements.....	107,020,000.....
British Indies.....	423,017,000.....
Ecuador.....	16,937,000.....
Dutch Possessions (Java and Sumatra).....	129,000,000.....
Peru.....	75,000,000.....
Chili.....	58,00,000.....
Australasia, (Australia, New Zealand, and Tasmania).....	460,436,000.....
Total.....	\$1,755,379,695

Of which \$1,494,625,000, or more than four-fifths is on steamship lines south of the latitude of Topolobampo.



TOPOLOBAMPO AS A STARTING POINT FOR PACIFIC AND ORIENTAL TRADE.

X.

TOPOLOBAMPO AS A STARTING POINT FOR PACIFIC AND ORIENTAL TRADE.

Trade Statistics.

ONE unfamiliar with the trade statistics of the foreign countries surrounding the Pacific Ocean would very naturally say, after examining the air-line diagrams on a previous page, "It is true the Topolobampo route is a short way to the Pacific coast, but when you reach its terminus you are too far south for the principal foreign trade of the Pacific."

In reply we state from official sources that *more than four-fifths of the total annual commerce of the foreign nations surrounding this ocean is on steamship lines south of the latitude of Topolobampo.*

China and Japan are of course north of the latitude of Topolobampo, but the annual foreign commerce of these two countries combined is but a trifle more than half that of Australasia alone.

This point may be seen by a reference to the statistical map on the opposite page, the value of the total annual foreign trade (exports and imports combined) of each country being opposite the steamship line projected from Topolobampo.

Ocean Distances.¹

Topolobampo is 1,144 statute miles nearer Callao, Valparaiso, and the other ports of the west coast of South America than is its chief commercial rival, San Francisco.

The distance from San Francisco to Aukland, New Zealand, is 6,537 miles, and from Topolobampo to the same point it is 213 greater, or 6,750 miles.

But in going from New York to Aukland by way of Topolobampo the saving by land (744 miles) more than counterbalances the 213 miles loss by ocean. In other words, the through route from New York to Auk-

¹ All ocean distances under this head were officially prepared by the hydrographic inspector of the U. S. Coast Survey, and have been reduced from nautical to statute miles, so that they may be combined with land distances. They were (except when otherwise expressly stated) all measured along "the most favorable steamer routes."

land by way of Topolobampo is 531 miles shorter than that *via* San Francisco.

From San Francisco to Sydney, Australia, is 7,383 miles, while from Topolobampo it is 7,923—a loss of 540 miles. But the land saving from New York to Topolobampo being 744 miles, the through trip to Sydney *via* Topolobampo is 204 miles shorter than by way of San Francisco.

From Topolobampo to India, (Calcutta,) the distance by steamer route is 1,656 miles greater than from San Francisco. Deducting from this the saving by rail from New York in favor of the Topolobampo route, (744 miles,) and the loss on the through trip from New York is only 912 miles.

But if we contrast the distances between these points by the most favorable route for *sailing vessels*, instead of *steamers*, the result is quite different. The sailing distance from San Francisco to Calcutta is 12,443 miles, and from Topolobampo to the same port, 13,121—a loss of but 678 miles, which is more than counterbalanced by the saving of 744 miles by land from New York—making a saving on the through trip from New York to India of 66 miles.

In this connection it should be observed that from the economic standpoint—the saving in freight charges—a saving of 744 miles by rail is sufficient, it is thought, to counterbalance a loss of five times that, or 3,720 miles by water. During the year 1880 the average freight charge per ton per mile on thirteen of the leading railroads of the United States was $1\frac{7}{100}$ cents.¹ It was recently stated in an unofficial publication that the average rate per ton per mile on the ocean is but one-fifth that on land, or only two mills.² If this estimate is correct, or only approximately correct, it follows that from the standpoint of economy in transportation the route from New York *via* Topolobampo to each and every foreign port on the Pacific is shorter than that *via* San Francisco.

Pacific Currents.

In Findlay's "North Pacific Directory," which work is the leading authority on this subject, is the following description of the currents: "The North Pacific is the most simple in the arrangement of its currents. It is a basin of circulation around a central area lying along the tropics, analogous to the Sargasso Sea in the North Atlantic, and having the same feature of a broad equatorial stream setting westward with more

¹ Third Annual Report on Internal Commerce. Appendix No. 36.

² Prospectus of the Galveston and Eagle Pass Air-Line Railway, page 13.

or less constancy, between 8° or 10° north and the tropic, a reverting and strongly marked current; the Japanese current, similar to the Gulf Stream, and a broad extra tropical belt, setting generally eastward, but subject to much fluctuation." The northern limit of the equatorial current here described is nearly opposite Topolobampo, the stream flowing from the west coast of Mexico directly across the Pacific to the Orient. Labrosse, in his Treatise on the navigation of the Pacific,¹ thus alludes to it: "According to the researches of Capt. Duperrey the waters of the Pacific show, in the intertropical regions, a tendency to drift towards the west with a variable rate, the mean rate of this movement being about 24 miles per day."

Pacific Trade-Winds.

In co-operation with this westward current is the northeast wind, which also extends from the Mexican coast westward across the Pacific. Findlay thus mentions it in connection with the other winds: "The general anemalogical arrangement of the North Pacific is thus: To the northward of about lat. 30° (a parallel varying with the season) are formed the S.W. anti-trade winds; between that parallel and lat. 7° or 10° N., (also varying with the sun's declination,) is found the N.E. trade-wind, and between the last-named parallel and the northern point of the S.E. trade-wind is a narrow belt of calms or variable winds to which the name of 'Doldrums' has been applied; it is a well-known belt of difficulty to the sailor." As Topolobampo is at lat. $25^{\circ} 32'$, it is within the limits of the N.E. trade-wind here described.

Under the head of "Passages," Findlay says on a subsequent page: "From what has been said of the meteorology of the North Pacific it will be manifest that its navigation is simple and easy in every part, with the important exceptions of those places lying in the belt of calms, &c., especially the bay of Panama. A voyage across the Pacific is carried on without difficulty, going eastward in the extra tropical portion influenced by the anti-trade wind, and to the westward within the area of the N.E. trade-wind. This applies to the eastern portion of the ocean, and whatever variations from a direct course on the western side may be necessary are due to the shifting monsoons of China and other Asiatic coasts."

It is then very apparent that both winds and currents are favorable to an almost direct passage of sailing vessels from Topolobampo to the Orient.

¹ The navigation of the Pacific Ocean, China Seas, &c., by Mons. F. Labrosse.

As an Outlet for Mexican Silver.

In the report to Congress in 1877, the U. S. Monetary Commission, usually called the Silver Commission, said : "Asia has been known in all historical times as the sink of silver." They substantiated the truth of this assertion by statistics, which show that there were imported by British India alone during the years 1836 and 1875, inclusive, (a period of 40 years,) about \$1,000,000,000 in silver, or \$25,000,000 per year.¹ And they further stated that during the year 1876 England alone exported to India and China \$45,975,438 in silver. Of course, England did not produce this silver, but first imported it from Mexico and the Western States of the United States. In reaching its final destination it had then to be transported nearly around the earth. The question naturally arises, why not ship it from the western coast of Northern Mexico directly across the Pacific to China, Japan, and India? Certainly, Northern Mexico can supply the whole demand, for from 1492 to 1875, inclusive, Mexico's silver product amounted to the enormous total of \$3,262,370,247, and the Northern States of that Republic are the richest of all in silver deposits.

The present annual silver product of Mexico is upwards of \$26,000,000, and her principal item of export is invariably silver. In 1873 her export of precious metals was \$25,373,673, nearly all of which was silver.

It requires but a glance at these figures to see that Topolobampo may be made the outlet for a silver supply sufficient for the Oriental demand, and in return an inlet for teas, silks, spices, and other valuable commodities of the East.

¹ Report of Monetary Commission, Senate Report 703, 44th Cong., 2d sess., pp. 74-76.

XI.

FERNANDINA HARBOR AND CITY SITE.

Description of Harbor.

FROM notes kindly furnished by Hon. D. L. Yulee we submit the following brief statement concerning the harbor and city site:

The entrance from the sea to the harbor of Fernandina is through the Cumberland Sound. This sound or bay is very capacious and affords well protected anchorage, in depths of from 30 to 70 feet, the depths of 30 to 50 feet at low water extending up and into the harbor of Fernandina. The entrance to Cumberland Sound is obstructed by a narrow sand bar, which at present admits only the same draught as at Charleston and Savannah. This obstruction removed, the deepest vessels afloat could sail up to the wharves at Fernandina. An improvement of this Cumberland entrance is now in progress, under charge of engineers of the United States, which will afford an available draught at ordinary high tide of 26 to 27 feet and at spring tides of 28 to 29 feet, and Gen. Q. A. Gillmore, under whose superintendence the work is being executed, reports to the Secretary of War that "a greater depth can be secured by raising the height of the jetties."

The harbor proper is extensive, deep, closely land-locked, with good holding ground, and has bold shores, making wharfing easy and cheap; and has connected with it very capacious and well protected anchorages between its wharves and the sea. The shores suitable for wharves begin within three miles of the outer sea buoy. Among other incidental advantages of this harbor is that the water procurable for ships is of such remarkable quality that it is carried upon voyages across the equator to Montevideo and other South American ports and back to Fernandina, without undergoing any change, or losing its purity and fitness for drinking.

Gen'l Gillmore states in the following letter, what results are designed by the works in progress at the entrance of Cumberland Sound:

UNITED STATES ENGINEER'S OFFICE,
NEW YORK, August 16, 1881.

Hon. D. L. Yulee:

DEAR SIR: In reply to your communication of the 15th inst., I have the honor to say that the low jetties I am now constructing at the entrance to Cumberland Sound will, in my opinion, maintain a low-water depth of twenty-one feet; and a *greater* depth than that can be secured by building the jetties higher than they were originally designed.

If appropriations are made in accordance with my estimates the works can be finished in three to four years.

Very respectfully, your obedient servant,

Q. A. GILLMORE,
Lt.-Col. Engineer and Bt. Maj-Gen.

The mean rise of tide at Cumberland entrance is six feet, and of spring tides 7 to 8 feet.

The following extract from report of Gen'l Totten, Chief Engineer U. S. Army, in 1844, (Ex. doc. 2, 2d sess. 28th Cong.,) is a very pointed tribute to the merits of the harbor:

"A very fine survey, recently completed by an officer of topographical engineers, of the mouth of St. Mary's river, or of Cumberland Sound, confirms the opinion long entertained that this, the most southern harbor on the coast of Georgia, is also one of the safest and most accessible."

In 1861, pending the late civil conflict, the Secretary of the Navy appointed a commission of remarkably eminent men in naval, military, and civil employment for the selection of a suitable harbor on the Southern coast for naval rendezvous and supply. They made the following report:

JULY 5TH, 1861.

Hon. Gideon Welles:

SIR: We have the honor to inform you that the conference, in compliance with your wishes communicated through Captain Dupont, has had under consideration that part of your letter of instructions, of the 25th ultimo, which relates to the necessity of occupying two or more points on the Atlantic coast, Fernandina being particularly mentioned as one of these points.

It seems to be indispensable that there should exist a convenient coal depot on the southern extremity of the line of Atlantic blockade; and it occurs to the conference that if this coal depot were suitably selected it might be used, not only as a depot for coal, but as a depot of provisions and common stores, as a harbor of refuge, and as a general rendezvous or headquarters for that part of the coast.

We separate in our minds the two enterprises of a purely military expedition and an expedition the principal design of which is the establishment of a naval station for promoting the efficiency of the blockade.

We shall have the honor to present plans for both expeditions; but we will begin with the latter, premising, however, that we think both of them should be conducted simultaneously.

Fernandina is, by its position, obviously the most desirable point for a place of deposit, answering at one end of the line, to Hampton Roads at the other.

In addition to its position in this respect, it enjoys several other advantages almost peculiar to itself, and well suited to the object in view. It has fourteen feet of water on the bar at low water, and twenty at high water, a convenient depth for all steam vessels of the navy, either propelled by screws or side-wheels, rated as "second-class steam sloops" and under, for all those rated as "first-class steam sloops" which are propelled by screws, and by most of the same class propelled by side-wheels when light, and by all the newly-purchased and chartered steamers of every description, with the exception, perhaps, of one or two of the very largest mail-packet steamers when deeply loaded.

These depths are perfectly convenient for the new sloops and gun-boats now on the stocks, and for the ordinary merchant vessels purchased or chartered for freight. The main ship channel over St. Mary's bar into Fernandina harbor, though not direct, is by no means tortuous or difficult; it is easily defined by buoys, and a range by means of beacons renders the passage of the bar itself secure.

Inside of the bar there is an unlimited extent of deep-water accommodation, and also the protection of smooth water before reaching the land-locked basins.

The anchorage in Amelia river possesses the quiet and safety of an enclosed dock. Repairs of all kinds may be carried on without the fear of accident arising from motion of the water.

* * * * *

We are careful to avoid making this communication unnecessarily long by entering upon a comparison of Fernandina with other places in the same region of coast—such as Brunswick, for example, which is now connected by railroad with Savannah, and being more in the interior, is less healthy; or St. John's entrance, * * * which has an insuperable objection in its bar; but we take pains to say that such comparisons have formed a large part of our study of the whole subject. We have not spoken of the *peculiar* advantages of Fernandina as a depot and naval station without attaching a meaning to the word.

S. F. DUPONT,

Captain U. S. Navy, President.

J. G. BARNARD,

Major U. S. Engineers, Member.

A. D. BACHE,

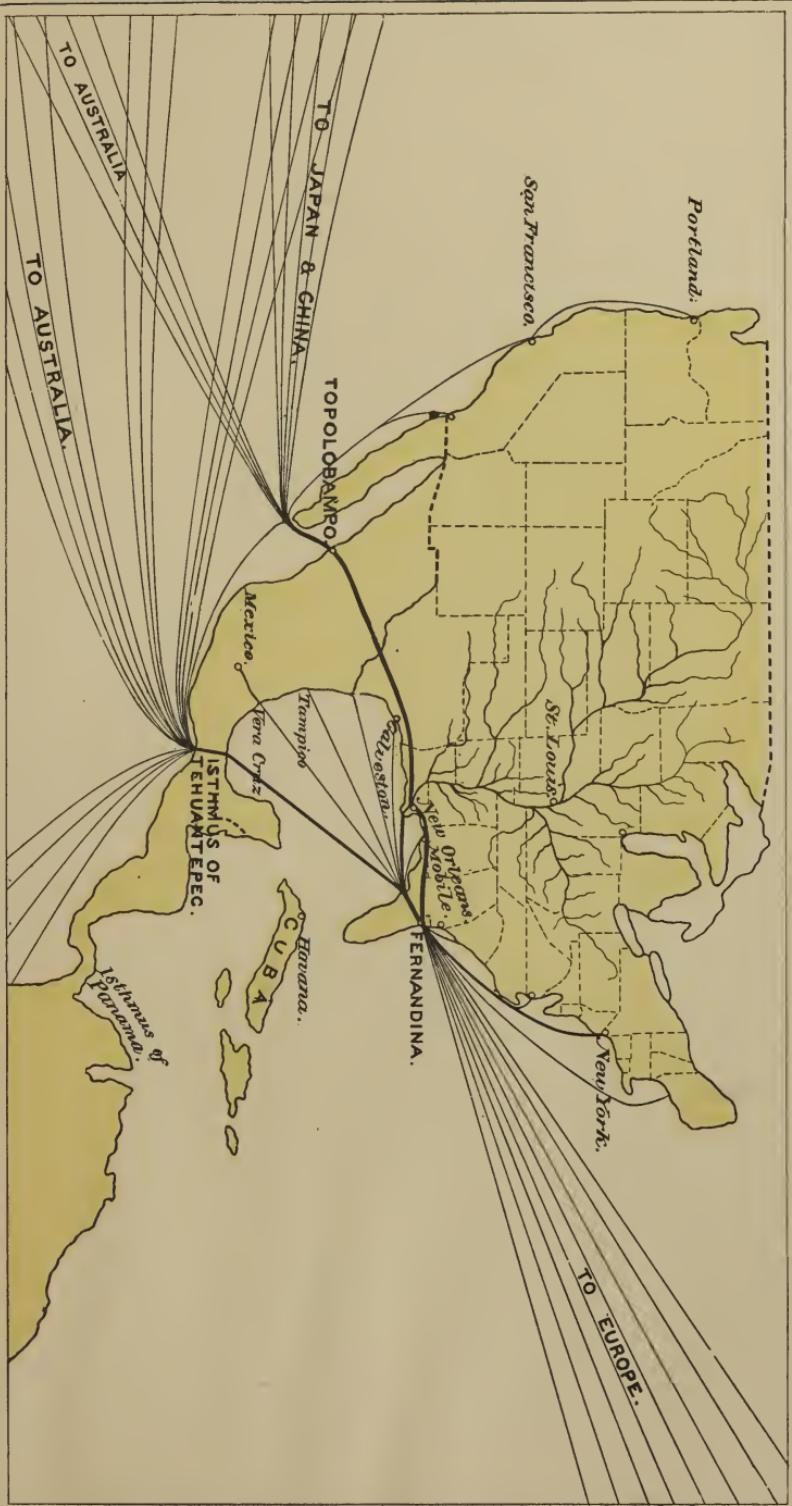
Superintendent U. S. Coast Survey, Member.

C. H. DAVIS,

Commander U. S. Navy, Member and Secretary.

Description of City Site.

The city of Fernandina is situated upon a sea island, entirely surrounded by the salt water of the ocean. No rivers with alluvial banks or fresh water connect with it. It is in latitude 30.40, longitude W. 81.26, at the head of the Florida Peninsula, and has therefore a mild winter climate, and being washed on its eastern side by the open Atlantic Ocean, and situated on the edge of the belt of northeast trade-winds, is always fanned by refreshing sea breezes, and a healthful and pleasant temperature maintained throughout the summer.



FERNANDINA AS A COMMERCIAL GATEWAY.

XII.

FERNANDINA AS A COMMERCIAL GATEWAY.

The diagram on the previous page shows that few cities have such remarkable geographical position as Fernandina. Its elements of future commercial greatness are on a level with those of Gonzalez City at the other end of the American and Mexican Pacific line.

To Southern Railways.

It is a natural gateway to the American and Mexican and Pacific trunk-line and to the railway system of the whole South for commerce from our own Atlantic ports and the ports of Europe.

To Gulf of Mexico and Mississippi Valley.

It is a gateway for vessels from the Atlantic ports of North America and Europe to the ship canal projected across Florida. It is also the starting point for a railway already in operation across the State to the Gulf at Cedar Keys. In other words, it is the gateway to the many important ports of the United States and Mexico resting upon the Gulf, or American Mediterranean, as it is frequently and appropriately called.

Above all, it is the starting point for the short and direct ship canal or water line from the Atlantic to the mouth of the Mississippi river, which, with its 42 navigable tributaries, intersects 21 States and Territories, and is navigable to the extent of 15,710 miles.

To Isthmus of Tehuantepec and Pacific Ocean.

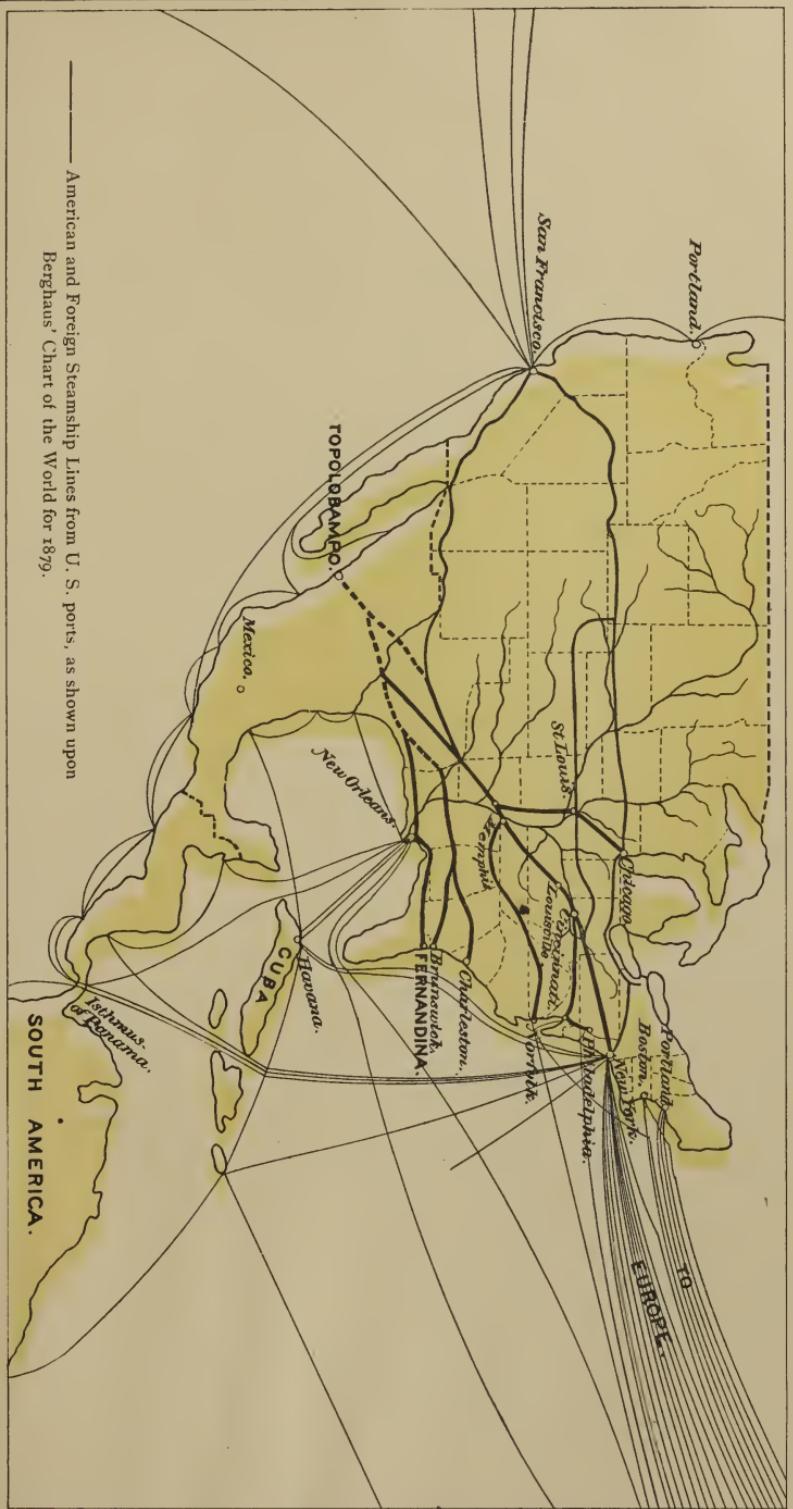
It is also the gateway to the proposed ship canal across Florida and the ship railway across Tehuantepec, which transit lines are intimately related and inter-dependent. It is therefore the gateway to the immense future commerce, which, after passing through the Gulf and Isthmus, will diverge to the ports of the Pacific and Orient.

To Atlantic Seaboard and Europe.

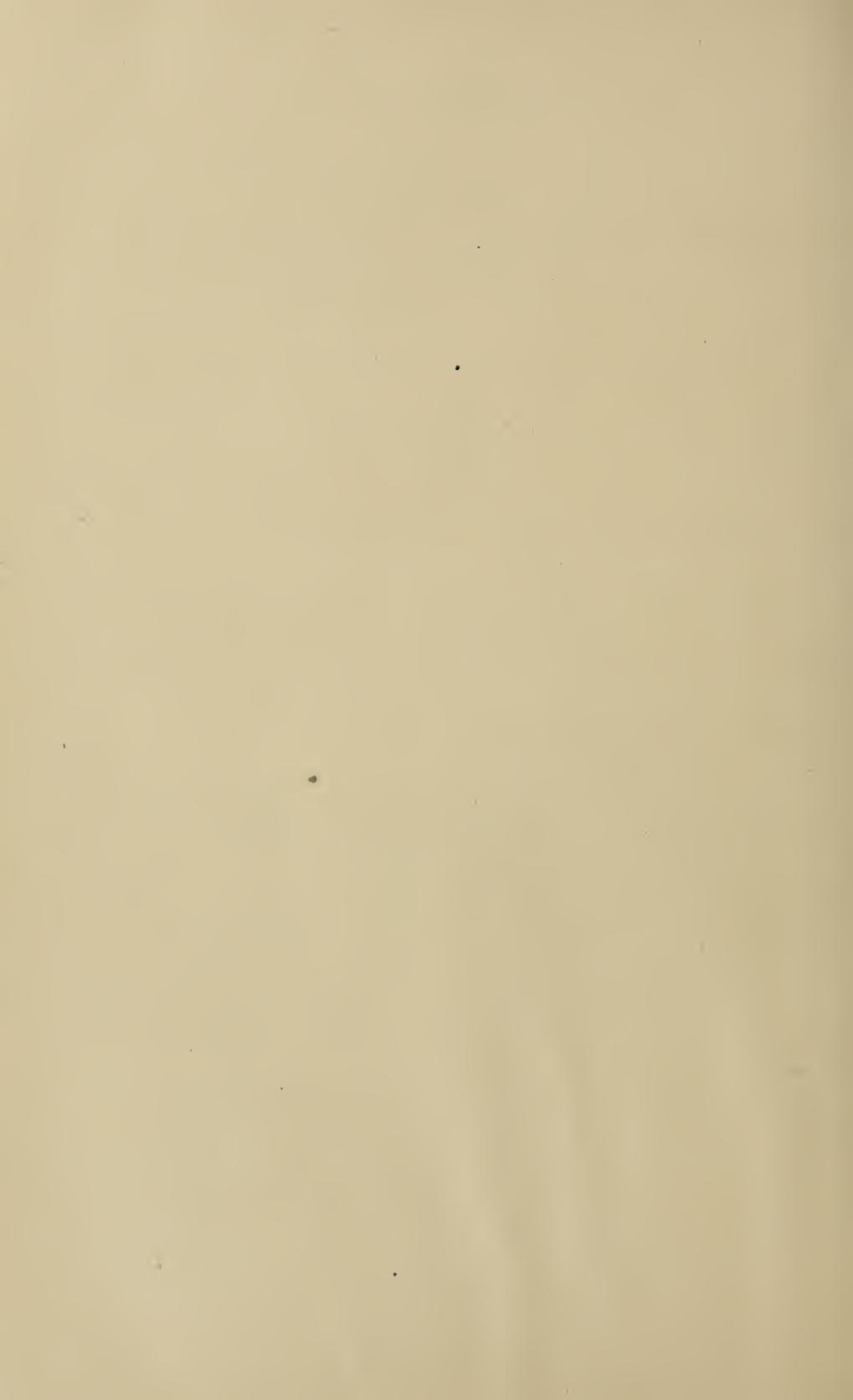
To reverse the picture it is the gateway for the coast-wise and ocean commerce coming from the mouth of the Mississippi river, the Gulf ports of the United States and Mexico, the ports of the Pacific and Orient to the Atlantic coast, and thence diverging to the ports of our own Atlantic coast, Canada, and Europe.

THE WEAK SIDE OF OUR FOREIGN COMMERCE, OR COMMERCIAL NECESSITY FOR ANOTHER PACIFIC RAILWAY.

American and Foreign Steamship Lines from U. S. ports, as shown upon
Berghaus' Chart of the World for 1879.



Total imports and exports to and from the ports of the United States during the year ending June 30, 1880, \$1,613,770,000.
Share of the same to and from San Francisco, (which port represents substantially all commerce to and from our Pacific ports,) \$81,624,219, or only five per cent.



XIII.

COMMERCIAL NECESSITY FOR ANOTHER PACIFIC RAILWAY.

The Weak Side of Our Foreign Commerce.

AS stated in the Historical Notes, the transportation lines of the United States from the interior to the seaboard have heretofore been chiefly to the Atlantic and Gulf ports, and outlets to the Pacific have been sadly neglected. But two Pacific railways have been completed—the Union and Central Pacific line, opened in 1869, and the Southern Pacific opened in 1881. They are insufficient for the adequate development of our foreign commerce with the countries and islands of the Pacific and Orient, as may be seen by a reference to official trade statistics.

According to the State Department Report on Commercial Relations for 1879, the total foreign commerce of those countries on the west (exports and imports of merchandise combined) was \$1,755,379,695, of which the whole United States controlled but \$72,743,116, or *only four per cent.*

The statement in detail is as follows:

	Total foreign commerce with all nations.	Share of the same to and from the United States.
Australasia.....	\$460,436,000	\$7,985,000
British Indies.....	423,017,000	10,592,000
China.....	198,000,000	12,187,000
Dutch Asiatic Possessions.....	129,000,000	5,800,000
Hong Kong.....	112,000,000	4,933,000
Straits Settlements	107,620,000	1,200,000
Peru.....	75,000,000	3,300,000
Chili	58,000,000	2,665,000
Japan.....	55,230,000	10,874,000
Ceylon.....	46,852,000	600,000
Philippine Islands.....	34,763,000	5,781,000
French Cochin-China.....	31,000,000	none separately reported.
Ecuador.....	16,937,000	1,280,000
Hawaiian Islands.....	7,524,695	5,546,116
Total.....	\$1,755,379,695	\$72,743,116
		or only four per cent.

But part of the trifling 4 per cent. controlled by the whole United States is to and from San Francisco, which port represents substantially all commerce to and from our Pacific ports. The balance of said percentage is chiefly to and from our Atlantic ports, by way of distant Cape Horn and the Isthmus of Panama.

Contrasting the three sides of the United States which face the ocean, we find on the east an intricate net-work of steamship lines spread over the Atlantic between our ports and Europe; on the south, American countries and islands, viz., Mexico, the West Indies, Central and South America, with a total annual commerce of \$928,027,200 in value, of which the United States controls 22 per cent., and on the west an immense foreign trade, in which the United States has almost no participation.

From the standpoint of our own annual foreign trade, the percentage on the Pacific side is almost equally small, viz.:¹

Total foreign commerce of the United States (exports and imports of merchandise, coin, and bullion combined) during the fiscal year ending June 30, 1880, \$1,613,770,633 in value.

Share of the same to and from our principal Atlantic and Gulf ports, \$1,430,322,592.

Share of the same to and from our minor ports, (chiefly on Atlantic and Gulf,) \$101,823,822.

Share of the same to and from San Francisco, (which port represents substantially all commerce to and from our Pacific ports,) \$81,624,249, or *only five per cent.*—not all of which is with Pacific and Oriental countries, but a part with Europe.

Our Foreign Commerce of the Second Century.

The second century of the Republic is likely to be distinguished for its commercial relations with the outside world. The first century was chiefly devoted to internal development and transportation lines, but the nation has outgrown the restraints of home affairs, and now seeks a broader field of action—a new merchant marine and new foreign markets for its surplus products and manufactures. The disgracefully weak spot in our foreign commerce above described must be built up and strengthened. The exports of the United States have heretofore been one-sided, not only in destination, but in quality. Agriculture was the first industry to be developed in the new Republic, and agricultural products and raw materials have constituted the chief portion of our shipments

¹ Compiled from Statistical Abstract No. 3, of U. S. Bureau of Statistics.

abroad. During the three fiscal years ending June 30, 1879, the percentage of domestic exports which were agricultural (viz., bread and breadstuffs, raw cotton, provisions and leaf tobacco) was as follows :

1877.....	68 per cent.
1878.....	73 "
1879 .. .	73 "

But this statement does not show the distinction between the exports of manufactured and unmanufactured articles as clearly as one given in the Annual Report on Commerce and Navigation for 1877, which covered a period of three years ending June 30, 1877, viz:¹

<i>Domestic Exports.</i>	<i>1875.</i>	<i>1876.</i>	<i>1877.</i>
Crude or partially manufactured articles.	\$492,996,479	\$522,139,920	\$554,744,111
Manufactured articles.....	66,241,159	72,677,051	78,235,969

The small export of manufactures here shown is, indeed, another weak spot in our foreign commerce.

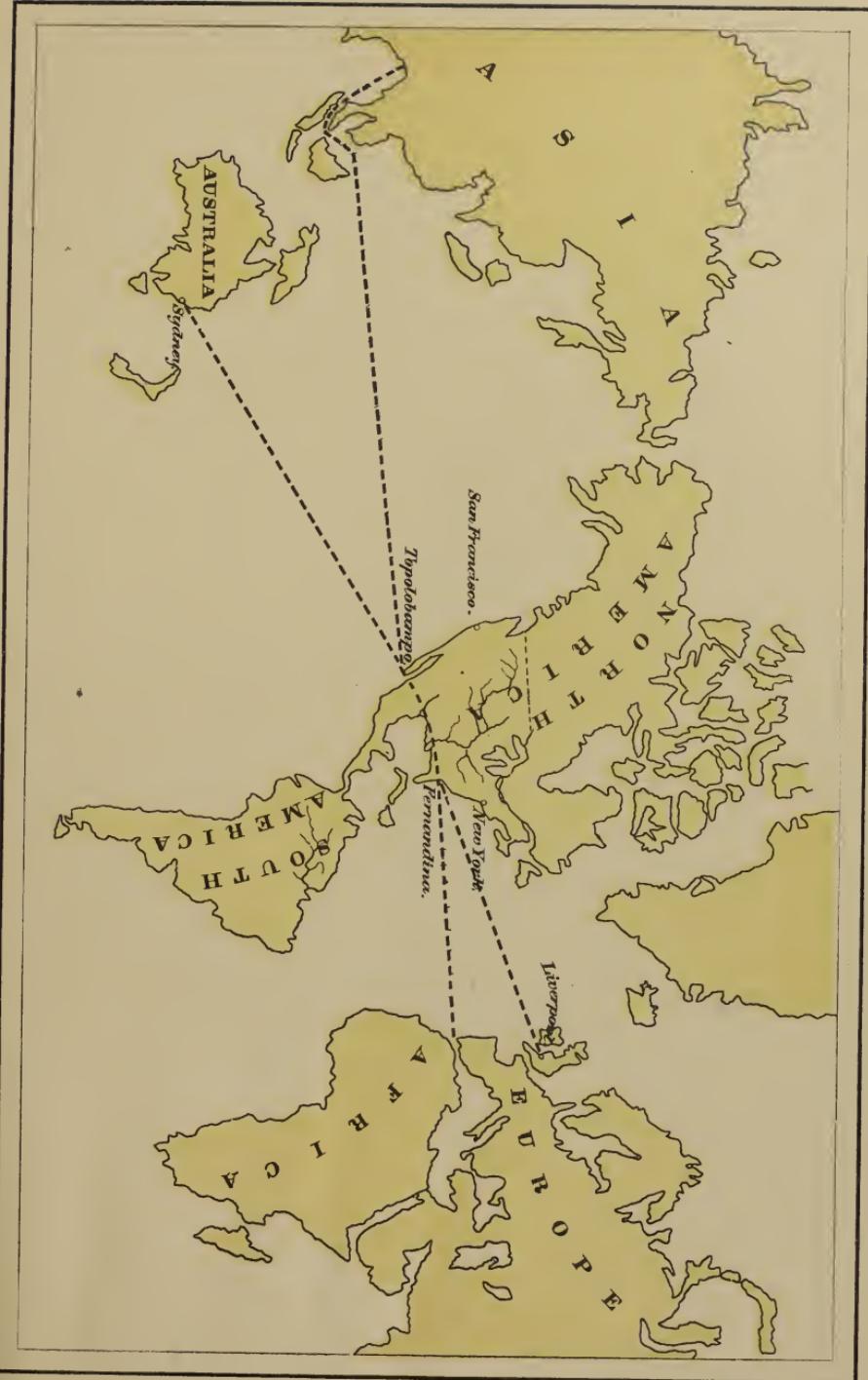
The time has now come when the industries of the United States should be diversified. Instead of exporting so large a percentage of raw products, we should reap the additional profit of transforming them into manufactures. But Europe prefers to purchase our raw material and manufacture for herself and other parts of the world. Hence, we cannot find there the market we need. We must, rather, look to the countries and islands surrounding the Pacific, which are deficient in manufactures and which will gladly buy of us when the Pacific is adequately bridged over with steamship lines.

Mission of the New Railway.

There is, however, a preliminary step which must be taken before covering the Pacific Ocean with our merchant marine and commerce, and that is the construction of adequate outlets to the Pacific coast. Herein lies the mission of the American and Mexican Pacific Railway, so projected as to form a short trunk-line supplementing the railway system of the Mississippi Valley, Texas, and the whole South, and connecting their commercial centres in a most advantageous manner with the Pacific.

¹ Commerce and Navigation for 1877, pp. xli and xlii.

RELATION OF THE AMERICAN AND MEXICAN PACIFIC RAILWAY TO THE WORLD'S TRADE.



XIV.

ITS RELATION TO THE WORLD'S TRADE.

We have, in previous chapters of this pamphlet, shown the relation of the American and Mexican Pacific line to the commercial exchanges between the east and west coasts of the United States, the two great Republics of North America and to the Pacific and Oriental trade. We desire, in conclusion, to briefly show its relation to the world's trade.

As an Air Line from Liverpool to Australia.

As will be observed by a glance at the map at the head of this chapter the railway is a central link in an almost air line from Liverpool to Australia. That signifies more than appears at first thought, for by reference to the trade statistics of the Pacific nations it will be found that the annual foreign commerce of Australasia (exports and imports combined) is greater than that of British India, more than double that of China, and more than seven times that of Japan.

The New Course of Empire.

During the last few years the star of empire over the continent has been deflected from its westward course toward the great Southwest, the great Republic of Mexico, so profusely endowed with natural wealth.

Over the seas its general course is the same, for it has recently been deflected from the Orient towards those great and fertile islands of the South Pacific—Australia and New Zealand.

The Transcontinental Railway under consideration, in harmony with this idea, is also advancing through Mexico to meet at its western terminus steamship lines projected to tap the rapidly increasing and enriching trade of the South Pacific.

APPENDIX.

Authorities on Northern Mexico.

Anderson, Alex. D.—The Silver Country ; or, The Great Southwest. A review of the mineral and other wealth, the attractions and material development of the former Kingdom of New Spain, comprising Mexico and the Mexican cessions to the United States in 1848 and 1853—with Hypsometric map. New York, 1877 : G. P. Putnam's Sons.

Arispe, Don Miguel Ramos de.—Memorial on the Natural, Political, and Civil State of the Province of Coahuila, in the Kingdoms of Leon, New Santander, and Texas. Translated from the Spanish. Phila., 1814.

Bartlett, J. R.—Personal Narrative of Exploration and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, connected with the U. S. and Mex. Boundary Commission, during the years 1850-'53. 2 vols. New York, 1854 : D. Appleton & Co. This work treats largely of Chihuahua and Sonora, and contains many excellent views of the country.

Box, M. J.—Adventures and explorations in New and Old Mexico, being the record of ten years of travel and research, and a guide to the mineral treasures of Durango, Chihuahua, the Sierra Nevada, (east side,) Sinaloa, and Sonora, (Pacific side,) and the southern part of Arizona. New York, 1869 : James Miller. It describes the valleys of all the rivers which flow into the Gulf of California, viz : The Sonora, Fronteras, Yagui, Mayo, Fuerte, and Sinaloa. Also the valleys of Northwestern Durango, and railway routes across Northern Mexico to the Pacific.

Chipman, C.—Mineral resources of Northern Mexico. New York, 1868 : Baker & Godwin.

Dahlgren, C. B.—Historic Mines of Mexico. A review of the famous mines of that Republic for the past three centuries, together with an account of various mining companies and railways. New York : 1883.

Froebel, J.—Seven Years' Travel in Central America, Northern Mexico, and the Far West of the United States. London, 1869: Richard Bentley. A large portion of this work is devoted to Northern Mexico.

Gregg, Josiah.—Commerce of the Prairies; or, The Journal of a Santa Fé Trader during Eight Expeditions across the Great Western Prairies, and a Residence of Nearly Nine Years in Northern Mexico. 2 vols. New York, 1844: Henry G. Langley.

Hamilton, Leonidas.—The Border States of Mexico, Sonora, Sinaloa, Chihuahua and Durango. 1882.

Humboldt, Alex. de (Baron.)—Political Essay on New Spain. 4 vols. London, 1822: Longman, Hurst, Rees, Orme & Brown. It is the leading authority on the resources of Mexico, and parts of it treat of the mines, mining districts, and general characteristics of Northern Mexico.

Oswald, Felix.—Summerland Sketches. Philadelphia, 1880: J. B. Lippincott & Co.

Owen, A. K.—Twelve or more pamphlets containing his arguments before the Committees of Congress, a Board of Army Engineers, &c., &c., in advocacy of the Topolobampo Pacific Railway route. They contain a great variety of information on the resources, topography, &c., of Northern Mexico.

Pike, Z. M.—(Capt. U. S. A.)—Diary of a Tour through the Interior Provinces of New Spain, in the year 1807, under the escort of Spanish dragoons.

Stone, Chas. P.—Notes on the State of Sonora. Washington, 1860.

Storrs, Augustus.—Answers of Augustus Storrs, of Missouri, to certain questions upon the origin, present state, and future prospect of Trade and intercourse between Missouri and the Internal Provinces of Mexico, propounded by Hon. Mr. Benton. Printed by order of the Senate of the United States, Jan. 3, 1825. Senate Doc. No. 7, 18th Cong., 2d session.

Ward, H. G.—Mexico in 1827. Next to Humboldt's "New Spain," this is one of the highest authorities on the mines of Mexico, and parts of it treat of the mines and other characteristics of Northern Mexico.

Weidner, Frederick G.—A pamphlet on the resources of Sinaloa. San Francisco: 1882.

Wilson, R. A.—Mexico and its Religion, with incidents of travel in that country during parts of the years 1851-'54. New York, 1855: Harper & Brothers. The last chapter and the appendix are devoted to the agriculture and mines of Northern Mexico.

Wislizenus, A.—Memoir of a Tour to Northern Mexico connected with Col. Doniphan's Expedition in 1846 and 1847, by A. Wislizenus, M. D., with a scientific appendix and three maps. Printed by order of the United States Senate. Jan. 13, 1848. Senate Mis. Doc. No. 26, 30th Cong., 1st sess.

Authorities on the West Coast of Mexico.

Acapulco.—Chart No. 872, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Alarchon, Fernando.—Voyage along the Gulf of California in 1540. In Hakluyt's Voyages, III, 505.

Angeles.—Chart No. 875, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Browne, J. Ross.—Resources of the Pacific States. A statistical and descriptive summary, with a sketch of the settlement and exploration of Lower California. New York, 1869: D. Appleton & Co. This contains a great variety of information concerning the Gulf of California.

Cape San Lucas and Mazatlan to Lat. 26° N.—Chart No. 621, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1873-'75.

Chippewa to Ventosa Bay.—Chart No. 876, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Dewey, George.—Remarks of Commander Geo. Dewey, U. S. N., on the Coasts of Lower California and Mexico. 1874: U. S. Hydrographic Office, publication 56.

Guatulco.—Chart No. 877, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Guaymas Harbor and Approaches.—Chart No. 640, U. S. Hydrographic Office. From the most recent surveys, verified by Commander Geo. Dewey, U. S. N., and officers of the U. S. S. *Narragansett*. 1874 and 1875.

Gulf of California, Coasts of, between parallels 26° and 29° 20' N.—

Chart No. 620, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1873-'75.

Gulf of California, Coasts of, from Lat. 29° 15' N. to the head of the Gulf.—Chart No. 619, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1873-'75.

Imray, James F., (F. R. G. S.)—North Pacific Pilot, Part I. The West Coast of North America between Panama and Queen Charlotte Islands. London, 1881: James Imray & Son. This is the latest and one of the best works on west coast of Mexico.

Isla Grande Harbor.—Chart No. 878, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Mazatlun Harbor.—Chart No. 642, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1874.

Mazatlán to Tenacatita Bay.—Chart No. 622, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1873 and 1875.

Mexico, the West Coast of.—From the boundary line between the United States and Mexico to Cape Corrientes, including the Gulf of California. U. S. Hydrographic Office publication. Washington, 1880. It is illustrated with numerous views of harbors, &c.

Morro Ayuca.—Chart No. 874, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Parker, Wm. H., (Commander Pacific Mail Steamship Co.)—Remarks on the navigation of the coasts between San Francisco and Panama. Washington, 1871: Government Printing Office. This pamphlet is so reliable that it is issued by U. S. Hydrographic Office to naval vessels.

Petatlán.—Chart No. 879, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Port Escondido.—Chart No. 874, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Sacrificios.—Chart No. 875, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

San Blas.—Chart No. 642, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1874.

Santa Cruz.—Chart No. 877, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Sihuatenejo.—Chart No. 879, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Tangola.—Chart No. 877, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Taylor, A. S..—Settlement and Exploration of Lower California. In J. Ross Browne's "Resources of the Pacific States." It contains much valuable information about the resources of the Gulf of California.

Teguepa.—Chart No. 879, U. S. Hydrographic Office. From survey by Commander J. W. Philip, U. S. N. 1879.

Topolobampo Harbor.—Chart No. 714, U. S. Hydrographic Office. From survey by Commander Geo. Dewey, U. S. N. 1874 and 1875.

Topolobampo Harbor.—Chart by U. S. Hydrographic Office. From survey by Commander W. T. Truxton, U. S. N. 1869.

Topolobampo Harbor.—Report on survey of, by Commander W. T. Truxton, U. S. N. 1869. U. S. Hydrographic Office publication.

Ulloa, Francisco.—Voyage from Acapulco up the Western coast of Mexico in 1539. In Hakluyt's Voyages, III, p. 473.

Authorities on the Currents, Winds, Navigation, &c., of the North Pacific Ocean.

De Kerhallet, Charles Philippe.—General examination of the Pacific Ocean, by Capt. Charles Philippe De Kerhallet, of the Imperial Navy, followed by Nautical Directions for avoiding hurricanes. Translated from the French under the direction of Commander Chas. Henry Davis, U. S. N., by authority of the author. Washington, 1869: U. S. Hydrographic Office publication No. 5.

Findlay, Alexander George, (F. R. G. S.)—A Directory for the navigation of the North Pacific Ocean, with descriptions of its coasts, islands, &c., from Panama to Behring Strait and Japan; its winds, currents, and passages. London, 1870; published for Richard Holmes Laurie. This work, containing about a thousand pages and several maps of currents, winds, &c., is the standard authority on the North Pacific.

Labrosse, F..—The Navigation of the Pacific Ocean, China Seas, &c. Translated from the French of Mons. F. Labrosse, by J. W. Miller, Lieut. U. S. N. Washington, 1875: U. S. Hydrographic Office publication No. 58.



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